QK1
.T5 P1 844
1822
v.4
c.2.

TRANSACTIONS,

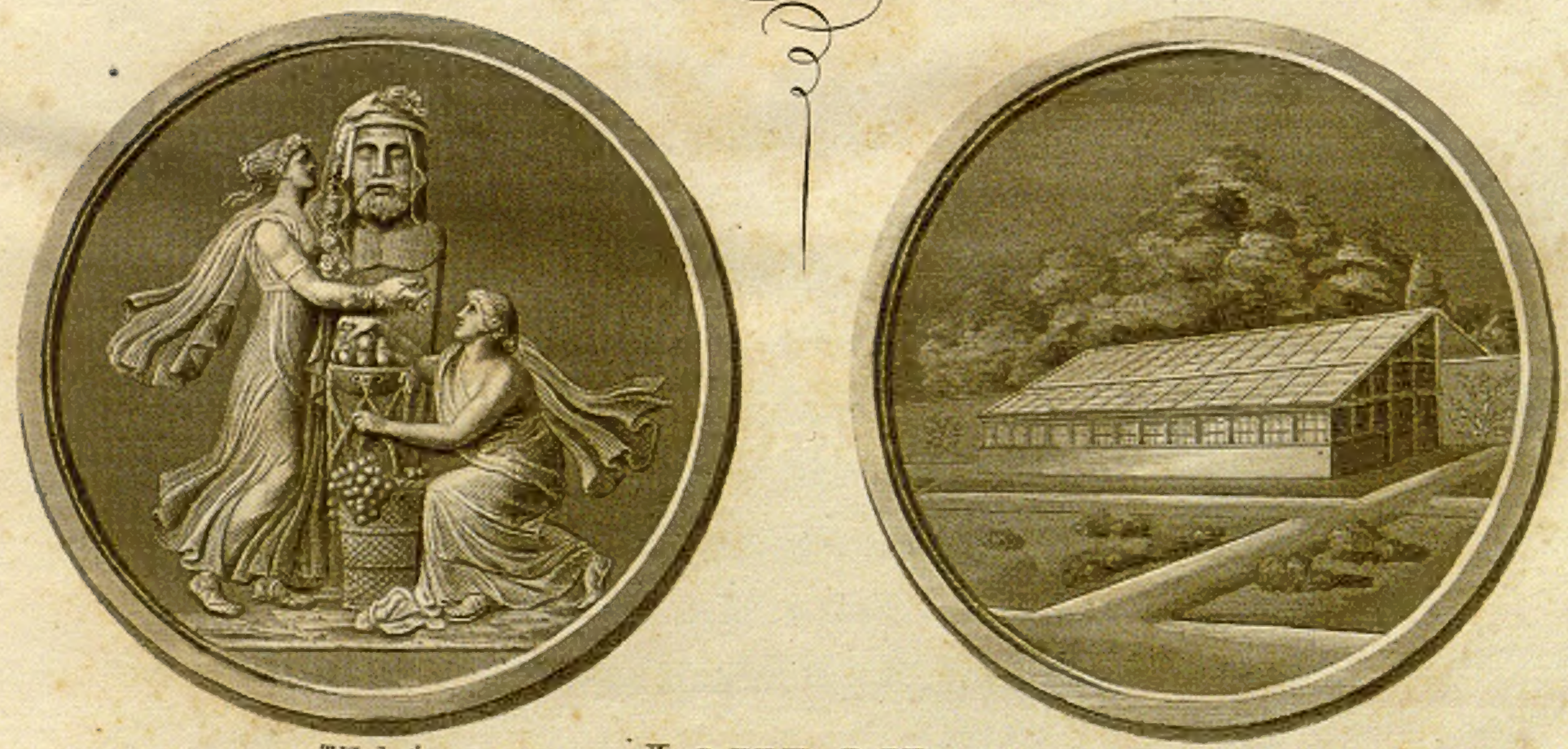
OF THE

Horticultural Society

OF

LONDON.

Volume IV.



LONDON.

Printed by W. Nicol, successor to W. Bulmer & Co.
Cleveland Row, St. James's.

MDCCCXXII.

Mo. Bot. Garden,
1897.

PREFACE.

THE Fourth Volume of the Transactions of the Horticultural Society of London has been published within the same period, and on the same plan as the Third Volume, with the addition of a Supplement to the Four Parts, which have appeared within the last two years, at regular intervals of six months.

On examining the contents of this volume, the Reader will not fail to perceive, that the number of the contributors of Papers is remarkably increased; and it cannot be observed without satisfaction, that a very great proportion of the Authors are practical men. Their number and the diversity of their situation in life furnish most convincing evidence of the progress made by the Society generally, in exciting attention to the objects of its institution, and of its influence, especially amongst that class of persons whose co-operation is essential in effecting what must ever be so much desired—the union of theory with actual practice.

The additions to the numbers of the Society was a source of exultation in the Preface to the preceding volume; the continued and uniform increase during the two last years cannot fail to afford to those who take an active part in the

Method by which it was obtained. By Mr. David Anderson, *F. H. S. Gardener to the Lord* Montagu, *at Ditton Park, near Windsor.* *p.* 318

XLIX. *On the Cultivation of the* Cocks-comb. *In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.* *p.* 321

L. *On the Classification of* Plums. *By Mr.* John Robertson, *F. H. S.* *p.* 323

LI. *Account and Description of the Varieties of* Chinese Chrysanthemums *which at present are cultivated in England; with Observations on the Difference between the* Chrysanthemum Indicum *of* Linnæus *and those Plants. By* Joseph Sabine, *Esq. F. R. S.* Secretary. *p.* 326

LII. *Description of a Mode of Cultivating* Pines, *as practised in the Garden of Mr.* Thomas Jenkins, *F. H. S. at the Portman Nursery, New Road, St. Marylebone. By* William Hooker, *Esq. F. H. S.* *p.* 363

LIII. *Observations on* Hybrids. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.* *p.* 367

LIV. *On the Cultivation of the* Ranunculus *and* Anemone. *In a Letter to the Secretary. By the Rev.* William Williamson, *C. M. H. S.* *p.* 374

LV. *Description and Account of the different Varieties of the* Garden Carrot. *By Mr.* William Christie, *Under Gardener to the Horticultural Society.* *p.* 383

LVI. *Notice relative to the Flowering of the* Agave Americana *in the open Air, in the Garden of* James Yates, *Esq. at Woodville, near Salcombe, in Devonshire. In a Letter to the Secretary. By* Abraham Hawkins, *Esq. F. H. S.* *p.* 389

LVII. *Account of the Mode of treating* Pine Plants, *so as to make them produce Fruit within the year. By* Peter Marsland, *Esq. F. H. S.* *p.* 392

LVIII. *Account of a successful Method of managing* Aquatic *and* Bog Plants, *as practised in the Royal Botanic Garden at Munich. By the Chevalier* Francis De Paula Schrank, *Foreign Member of the Horticultural Society.* *p.* 395

LIX. *Directions for preserving* Buds of Fruit Trees *in a vegetating State, when sent to considerable distances. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.* *p.* 403

LX. *Observations on a Method of Training* Apple, Cherry, *and* Plum Trees, *in Russia, to preserve them from Frost during the Winter. By Mr.* Joseph Busch, *Corresponding Member of the Society, Gardener to His Imperial Majesty the Emperor of Russia.* *p.* 405

LXI. *Notices of Communications to the Horticultural Society, between February* 1*st*, 1820, *and August* 1*st, of the same Year, of which separate Accounts have not been published in its Transactions. Extracted from the Minute Books and Papers of the Society.* *p.* 407

LXII. *Notice relative to the Management of the* Crinum Amabile; *with some Account of, and Observations on, the Plant so named. By Mr.* James Verrel, *Gardener to the Right Hon. Sir* Charles Long, *G. C. B. F. H. S. at Bromley Hill, in Kent.* *p.* 419

LXIII. *Upon* Pruning *and* Training *the* Plum Tree. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.* p. 426

LXIV. *On the Management of the* Fig Tree *in the open Air. In a Letter to the Secretary. By the Rev.* George Swayne. *A. M.* *p.* 428

LXV. *An Account of a* Steam Apparatus. *In a Letter to the Secretary. By Mr.* Joseph Hayward. *p.* 434

LXVI. *Upon the Managing of* Fruit Trees in Pots. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.* *p.* 439

LXVII. *Notice respecting several* Vegetables *used as Escu-lents in North America. In a Letter to* Richard Anthony Salisbury, *Esq. F. H. S. &c. By* M. Joseph Correa de Serra, *F. R. S. &c.* *p.* 443

LXVIII. *An Account of an improved Method of raising* Early Potatoes *in the open ground. In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.* *p.* 447

LXIX. *On the Cultivation of* Pinks. *In a Letter to the Secretary. By Mr.* Thomas Hogg. *p.* 451

LXX. *On a Method of raising* Early Cucumbers. *In a Letter to the Secretary. By* Richard Vachell, *Esq. F. H. S.* *p.* 455

LXXI. *On the* Ayrshire Rose. *By* Joseph Sabine, *Esq. F. R. S. &c. Secretary.* *p.* 456

LXXII. *Description of the* Steam Pits, *in the Imperial Gardens of Taurida at St. Petersburgh. In a Letter to the Secretary. By Mr.* Martin Miller Call, *Gardener to His Majesty the Emperor of Russia.* *p.* 468

LXXIII. *An Account of the Cultivation of* Mushrooms. *By Mr.* Thomas Rogers, *Gardener to* Edward Jenkins, *Esq. F. H. S. at Thorpe Hall, near Peterborough.* *p.* 472

LXXIV. *The Method of Propagating choice* Dahlias *by grafting their Shoots on the Tubers of the Roots of more common kinds. In a Letter to the Secretary. By Mr.* Thomas

Blake, *Gardener to* James Vere, *Esq. F. H. S. at Kensington Gore.* *p.* 476

LXXV. *Observations on the Cultivation of* Strawberries; *with Remarks on the rapid Formation of their Blossoms and Fruit. In a Letter to the Secretary. By the Reverend* Thomas Garnier, *F. H. S.* *p.* 479

LXXVI. *On the Cultivation of the American* Cranberry in dry Beds. *By* Robert Hallett, *Esq. F. H. S.* *p.* 483

LXXVII. *Account of a new Esculent Vegetable called* Tetragonia, *or* New Zealand Spinach. *By Mr.* John Anderson, *Corresponding Member of the Horticultural Society, Gardener to the Earl of* Essex, *F. H. S. &c. at Cassiobury, in Hertfordshire.* *p.* 488

LXXVIII. *On Grafting the* Vine. *By* Thomas Andrew Knight, *Esq. F. R. S., &c. President.* *p.* 495

LXXIX. *On the Production of a* Hybrid Amaryllis. *In a Letter to the Secretary. By* James Robert Gowen, *Esq. F. H. S.* *p.* 498

LXXX. *Account of some* Standard Fig Trees *in a Garden at Sompting, near Worthing, in Sussex. By* Joseph Sabine, *Esq. F. R. S. &c. Secretary.* *p.* 504

LXXXI. *Notices of New or Remarkable* Varieties of Fruits *ripened in the Summer and Autumn of the Year* 1820, *which were exhibited at the Meetings of the Horticultural Society.* *p.* 508

LXXXII. *On* Forcing Plums. *In a Letter to the Secretary. By* John Townsend Aiton, *Esq. F. H. S.* *p.* 531

LXXXIII. *Notice of a* Pit *for fruiting* Pines *and* Melons, *with Observations on the* Production of Seeds of Pine Apples. *In a Letter to the Secretary. By Mr.* William

Buck, *Corresponding Member of the Horticultural Society, Gardener to the Honourable* Fulk Greville Howard, *F. H. S. &c. at Elford, near Lichfield.* *p.* 533

LXXXIV. *Account of the* Cultivation *of the* Water Cress, *as practised by Mr.* William Bradbery, *at West Hyde, near Rickmansworth, in Hertfordshire. In a Letter to the Secretary. By* Henry Bellenden Ker, *Esq. F. R. S. &c. p.* 537

LXXXV. *On the Cultivation of the* Pine Apple. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.* *p.* 543

LXXXVI. *Notice relative to the* Flowering of Lilium Japonicum. *In a Letter to the Secretary. By Mr.* Samuel Brookes, *F. L. S. & H. S.* *p.* 551

LXXXVII. *Notices of* Communications *to the Horticultural Society, between August* 1st, 1820, *and May* 1st, 1821, *of which separate Accounts have not been published in its Transactions. Extracted from the Minute Books and Papers of the Society.* *p.* 555

LXXXVIII. *On the Cultivation of* Chinese Chrysanthemums. *In a Letter to the Secretary. By Mr.* Joseph Wells, *Gardener to* William Wells, *Esq. F. H. S.* *p.* 571

List of Authors, with the Title of their respective Communications. *p.* 575

List of Drawings of Fruits, executed by Order of the Council, between May 1, 1819, *and May* 1, 1820.

List of Drawings of Fruits, executed by Order of the Council, between May 1, 1820, *and May* 1, 1821.

List of Medals and Rewards, presented by Order of the Council of the Horticultural Society *of* London, *from May* 1, 1819, *to May* 1, 1820.

CONTENTS.

List of Medals and Rewards, presented by Order of the Council of the Horticultural Society *of* London, *from May* 1, 1820, *to May* 1, 1821.

List of Banksian Medals, presented by Order of the Council of the Horticultural Society, *for Exhibitions at General Meetings of the Society, from May* 1, 1820, *to May* 1, 1821.

List of Books, and other Articles, presented to the Library of the Society, from May 1,1819, *to May* 1, 1820, *with the Names of the Donors.*

List of Books and other Articles presented to the Library of the Society, from May 1, 1820, *to May* 1, 1821, *with the Names of the Donors.*

ERRATA.

Page 38, l. 8, for *these*, read *any*.

445, l. 25, and in the Note, for NUTTAL, read NUTTALL.

ib. l. 26, for *Psoralia*, read *Psoralea*.

LIST OF THE PLATES.

1. The Alexandrian Ciotat Grape - *to face p.* 8
2. Mr. Herbert's Hybrid Gladioli - - 47
3. Various Modes of Glazing - - 87
4. The Kishmish Grape - - - 212
5. Improved Cucumber Pit at Castle Ashby, . 223
6. The Pitmaston Orange Nectarine 232
7. Hollow Wall 244
8. Vinery at Shobden Court . . . 256
9. Passiflora cæruleo-racemosa . . . 261
10. Conservatory at Shipley 314
11. Psidium Cattleianum - - - 316
12. Chrysanthemum Indicum *Linn.* - - 330
13. Chrysanthemum Indicum flore pleno - 330
14. The Quilled Flamed Yellow Chrysanthemum 350
15. Jenkins's Pine Stove - - - - 364
16. Quarter for Bog Plants - - 402
17. Hague's Steam Apparatus - - 437
18. Steam Pits in the Gardens of the Taurida Palace, 469
19. Flat Peach of China - - - - - 512
20. Marie Louise Pear - - - - - 519
21. The Gravenstein Apple - - - - 523
22. Pit for fruiting Pines and Melons - - 555

TRANSACTIONS

OF

THE HORTICULTURAL SOCIETY.

I. *Upon the Means of giving Strength to the Stems of Plants growing under Glass.* *By* THOMAS ANDREW KNIGHT, *Esq. F. R. S., &c. President.*

Read January 18, 1820.

THE forms of the stems of trees and shrubs which grow under glass, are generally found much more slender and weak than those of other plants of the same species, which grow in the open air ; often to such an extent as to render necessary the unsightly appendage of supports, or props ; and, in many of those species, which are cultivated for ornament only, to destroy the relative proportions requisite to constitute beauty. These defects may be traced to a concurrence of causes, to the shade necessarily given by the roof of the house, to the injudicious application of high temperature at periods when light cannot be obtained, and to the too close contiguity of plants to each other ; but chiefly to the total absence of the motion which is naturally given by winds.

I have stated the results of experiments, in the Philosophical Transactions of 1803 and 1811, which, I believe, satisfactorily prove, that if the stems, or branches, or roots, of a tree be in any part bent by the action of winds, an increased quantity of alburnum will be, in such parts, generated; by which means additional strength will be given wherever it is requisite to preserve the tree, in any situation where art, or accident, may have placed it. Hence the insulated tree upon the mountain necessarily acquires the short and sturdy form best adapted to enable it to brave with impunity the fury of the storm, and long and slender stems are as necessarily confined to more sheltered situations.

I have subsequently ascertained that the hand of the gardener can readily do, within the forcing-house, all that is beneficially done by winds out of it: and I am perfectly confident that not only the beauty, but the health also of the tree is improved by being given the form and proportion, which nature intended it to receive. To effect this, the stem should be bent in every direction nearly as far as can be done without danger of breaking it: but how frequently this must be done, to produce the requisite effect, I am not at present prepared to say; having, in all my experiments, been rather endeavouring to discover the utmost degree of strength, which could be given, than the degree which would simply prove beneficial to the plant. I have, however, some reason to believe, that the operation need not be, in any case, repeated more often than once in eight or ten days, and that only during the periods in which the stems and branches are increasing in bulk.

The extent to which the diameter of the stem of a plant, comparatively with its length, may be increased by the means above-mentioned, is probably much greater than will easily be credited. A Dahlia plant of a year old, and growing in a pot, in the forcing-house which I usually devote to experiment, presented, in the spring of 1817, a stem, which at half its height from the mould, exceeded an inch in diameter when it was only twenty-two inches high; though the experiment was made in April and May, and of course before the sun had nearly acquired its full powers, and under glass of by no means good quality. But both myself and my gardener had frequent occasion to enter the house; and neither of us, I believe, ever passed the plant without bending it; which ultimately became an operation which required very considerable force. The Dahlia is not, however, one of those plants which can receive benefit by this mode of treatment; for the excessive strength of the stem would only expose the soft and succulent branches to more certain destruction upon the plant being removed into the open air: and I mention the result of the experiment merely to illustrate the effects of the process I have recommended.

II. *Account of an improved Method of planting* Vines *for forcing. In a Letter to the Assistant Secretary. By Mr.* Daniel Judd, *F. H. S.*

Read, January 4th, 1820.

Sir,

Agreeably to your wish, I send you an account of my management of the *Vines* which you saw lately, and appeared to be so much pleased with, in the garden of Charles Campbell, Esq. of Edmonton, of which I have the charge.

My compost was formed as follows: in the winter of 1817, I procured a quantity of the top spit of soil from a common in the neighbourhood, which consisted of a rich loam, rather inclining to be gritty, which property I prefer, because it gives a porousness to the compost, thereby allowing the water to pass freely through it. At the same time I collected some lime rubbish, well broken to pieces and sifted, some old tan, some leaf mould, and a quantity of the richest old dung I could select from the forcing beds, and elsewhere.

These materials having been kept separate, and frequently turned over in the summer, were mixed together in the Autumn of 1818, in the following proportions; one half of loam, one-fourth of dung, and one-fourth of lime rubbish, united with the tan, and leaf mould. They were well mixed, by frequent turnings (but were not sifted) during the winter, when the weather was frosty or dry, for this operation should never be performed in wet weather.

It may be noticed, that I did not use so much dung in my compost as is sometimes done, for I have observed that an excess of it retards the growth of the Vine, notwithstanding it is considered to be a plant which will bear an extraordinary quantity of manure. The addition of old tan to the compost, which is not usual, I recommend, because I know from experience, that the Vines will root in that more freely than in any other substance.

In March last, the border, in front of the Vinery, was cleared to the depth of upwards of three feet, below which it was drained, and then filled up with the new compost to the level of the bottom plate of the house; this was done in fine weather, and the new mould had full two months time to settle well, before the young Vines were planted in it.

My Vine plants were raised from single eyes, in March 1818; they were treated in the usual way through the summer, and kept from the frost during winter, until March last, when they were cut down to one eye, and placed in the Pine-pit, in order to produce young shoots of sufficient length to draw into the house at the time of planting. After they had made shoots about two feet long, they were removed to the green-house (which was at that time kept at a temperature of about 60°, for some other purposes); here they continued growing, till they had attained to the length of three or four feet; by this treatment the whole plant was rendered more hardy, and consequently more fit for its final removal into the open border.

Early in May, having made good the height of the border quite to the level of the holes where the plants were to be carried into the house, so that no part of their stem should

be exposed to the external air, I opened the holes, for the reception of the plants, leaving them open upwards of a week, to remove any noxious quality in that part of the compost which would first receive the roots.

My planting was executed on the 13th of May, but I consider that any period between the 10th of May, and 10th of June, will be equally successful, provided the work be done in seasonable weather, that is, when it is neither wet nor cold.

At the time of planting, I turned into each hole, a common wheelbarrow-full of very old tan from the Pine-house, in the middle of which tan the roots of my Vine plants remained after the plants had been treated as I shall now describe. I first cut off the leaves from the lower part of the plant, about two feet and a half of its length, leaving about an inch of the footstalk of each on the plant, the end of which was then drawn very carefully through the hole, under the plate, without injuring the tender part of the shoot. The pot being removed, the ball or root of the plant was placed two feet distant from the front of the house, upon its side, so that the stem lay in a horizontal position, about six inches below the level of the surface of the border. When thus placed, the whole of the stem which was to be covered was slit or tongued, at each eye, like a Carnation layer, by passing a sharp knife at three quarters of an inch below each eye, and on the side of the eye, about one third of the thickness into the wood, and then upwards to the centre of the joint. This being done, the stem was covered with about four inches of old tan, and the other two inches were filled up with the mould of the border. It is essential to the safety of the plant that the slitting be done

the last thing, and whilst it is laid in its position, least the stem should be broken.

The effect of the operation of slitting the stem, is the production of abundance of roots from every eye; the progress is not very great, until the roots begin to push out; after these shoot, it is surprising how fast the Vines grow.

I gave a little fire in the house for the first month after planting, though sparingly, and air was admitted into it continually, until the plants had got sufficient hold of the border; air was then admitted in the day, but the house was shut up at night. Under this treatment, the shoots of the present season, of these young plants, are from twenty-five to thirty feet long, and their strength is fully proportionate to their length.

It is not my intention to grow any thing on the border, which will exhaust it, or deprive the Vines of their full nourishment. To protect their roots in the winter, I shall use a covering of old tan, about six inches thick, which I prefer to dung or mulch of any description.

I have this season planted Vines in the same way, in other houses, besides the one I have now mentioned, and with equal success.

I am, Sir,

Your obedient humble Servant,

DANIEL JUDD.

Edmonton, Nov. 3, 1819.

III. *Account of the* Alexandrian Ciotat Grape, *a new Seedling Variety. In a Letter to the Secretary. By* John Williams, *Esq. Corresponding Member of the Horticultural Society.*

Read January 4th, 1820.

Dear Sir,

I have this day forwarded to you two bunches of a new *Seedling Grape*, the result of an attempt to improve the flavour of the Parsley-leaved Grape, or *Ciotat* of Canada. The object I wished to obtain in raising a seminal variety of this Grape, was a Vine with the leaves much divided, which would lessen the shade, and permit other plants to receive light on the floor of a forcing-house. I, therefore, impregnated several blossoms of the Parsley-leaved Grape with the pollen of the White Muscat of Alexandria, and obtained four plants from the seed. The specimen I send you is the fruit of one of these. The wood and buds bear a strong resemblance to the Muscat of Alexandria; the leaf is smaller, and the lobes more divided, but not so much divided as those of the Ciotat.

This fruit has the fleshy firmness of the Muscat of Alexandria, but has none of the perfume. The plant is a great bearer, and grows with extraordinary vigour, the berries, however, set rather thin on the bunch; but it possesses one good quality, that of keeping without withering or rotting, much longer than most other Grapes. The bunches I send you have been nearly in the same state for the last two months; and two years ago, a bunch gathered in January,

The Alexandrian Cluster Grape.

and hung on a string, in an airy room, kept till April. Whether this was an accidental circumstance or not, I cannot say, for I gave the original plant to my brother, and have only introduced it into my own forcing-house, within these two years.

I am,

DEAR SIR,

your's truly,

JOHN WILLIAMS.

Pitmaston, near Worcester,
January 1, 1820.

IV. *Account and Description of the Varieties of Autumn and Winter* Radishes. By Mr. William Christie, *Under Gardener to the Horticultural Society.*

Read, January 18th, 1820.

In a Paper on the different kinds of Spring Radish, which was drawn up by the late Gardener of the Society, and since published in their Transactions,* it was intimated that a similar account would be given of the *Autumn* and *Winter Radishes.* In conformity with the wishes of the Garden Committee, this task has fallen upon me. I cannot but feel highly sensible of the kindness shewn to so young a practitioner, in being thus selected for the performance of this duty,and I trust that in endeavouring to execute it, I shall not discredit the confidence with which I have been honoured.

The Seeds of all the kinds of Autumn and Winter Radish which had been collected for the purpose, were sown in July last in an open border, in the Experimental Garden of the Society; they were kept properly clean from weeds, and were duly thinned and watered through the autumn. As they advanced in growth, they were, at successive periods, examined and tasted, and from the notes made at those times the following descriptions are given.

Our old gardeners, if we may rely on the authority of

* Volume III. page 436.

GERARD,* were acquainted with only one of the sorts of Winter Radish which were cultivated in the Society's Garden last season; it is called, in the work referred to, *Raphanus pyriformis sive radice nigro*, or the Black or Pear-fashion Radish, and is certainly the same as our Black Spanish Radish. The figure given of it by GERARD represents the root as it appears before it acquires the size at which it is fit for use. MILLER, in the eighth edition of his Dictionary (1768), describes the *Raphanus niger*, or Black Spanish Radish, as used in winter; and almost every modern book on Horticulture also notices it.

Another sort, the *White Spanish Radish*, is slightly mentioned in a few Gardening books of recent date; but it seems to be little used, for the Society received only one packet of it amongst the collections of Radish seed from the British seedsmen, and that was supplied by Mr. LEE of Hammersmith, who received it from a foreign correspondent, by whom it was obtained from Augsbourg. MILLER, in the edition of his Dictionary above referred to, calls it the *Raphanus orbiculatus*, or White Spanish Radish. The sort is noticed more particularly by JUSTICE, in the *British Gardener's Director*, published at Edinburgh in 1764; he states that the White Spanish Radish is eaten in November, and the Black in Winter. MILLER says that both kinds are principally used for medicinal purposes, but that some persons like them for the table. I have not been able to ascertain how, or from what cause, they acquired the name of *Spanish* Radishes.

The seeds of these two sorts, as well as of the others which

* GERARD's Herbal by JOHNSON, page 238.

I shall now proceed to describe, were received from M. VILMORIN, in the collection of garden seeds, which he sent from Paris last spring, for the use of the Society. I have given the original French names, in the first instance, not having authority for English appellations for the whole; where they have been before described by British writers, I have given their names also; in the other cases, the French terms have been merely translated. Some of the kinds being better adapted to late summer and autumn, than to winter consumption, I have arranged the whole in the order in which they progressively come into use.

1. *Le Radis Jaune.* The *Yellow Turnip Radish*, described in the Paper on Spring Radishes,* has an oval bulb, with a mouse-tail root; it grows large, to full four inches in diameter when old, but should be eaten young, and is then a good Radish. The flesh is mild, crisp, solid, and quite white; the outside is yellowish brown, the leaves grow upright and long, with footstalks of a light green.

2. *Le Radis Gris Rond.* The *Round Brown Radish*, may be called *round*, though it is rather irregular in shape; it grows large, and then becomes hollow; it should, therefore, be used when young. The flesh is mild, rather soft, and of a greenish white; the outside coat is mottled with greenish brown, the leaves grow upright and long, with green footstalks.

3. *Le Radis Gros Blanc d'Augsbourg*, is the same as the *White Spanish Radish.* It has an oval bulb, tapering into a tap root, it grows to a large size, and is good in that state. The flesh is rather hot, firm, solid, and white; the outside coat is white, tinged with green, and slight purple on the part

* Horticultural Transactions, Volume III. page 445.

which is exposed above the ground ; the leaves are long, and tinged with purple on the footstalks.

4. *Le Radis Gris Oblong.* The *Oblong Brown Radish*, has a pear-shaped bulb, with an elongated tap root ; it does not grow particularly large, and is hardier than any of the preceding, and therefore fit for late use. The flesh is hot, firm, hard, and white ; the outside coat is rough and brown, marked with white circles ; the leaves are dark green, and rather spread over the ground ; the footstalks are stained with purple.

5. *Le Radis Gros Noir d'Hiver*, or *Le Radis Raifort*, is our *Black Spanish Radish ;* its bulb is oval, or rather regularly pear-shaped, with a long small tap root ; at first the root is thin, but it swells as it advances in age, and acquires a large size. The flesh is hot, firm, solid, and white ; the outside coat is rough and black, the leaves are long, and incline to grow flat on the ground ; the footstalks are purple.

6. *Le Radis Gros Violet d'Hiver.* The *Large Purple Winter Radish* is a beautiful variety, derived, without doubt, from the Black Spanish, and may therefore be properly called the *Purple Spanish Radish.* In shape and character it much resembles the Black Spanish Radish, but the outside, when cleaned, is of a beautiful purple colour, though it looks black when first drawn from the earth, and the coat, when it is cut through, shows the purple very prettily. The footstalks of the leaves have a much deeper tinge of purple than the other kind.

The above six kinds of Radish, will supply the table with variety in succession, through the autumn and winter, if the whole are sown in July and brought into use in the order in

which I have described them ; those which are intended for winter use should be taken up in dry weather, in November, be divested of their leaves and fibres, and preserved in sand until they are wanted.

V. *On the Production of* Hybrid Vegetables; *with the Result of many Experiments made in the Investigation of the Subject. In a Letter to the Secretary By the Hon. and Rev.* William Herbert, *D. C. L. F. H. S. &c.*

Read December 21, 1819.

My dear Sir,

It was your wish, that I should address some further communications to the Horticultural Society, concerning the production of *Hybrid Vegetables.* It would, perhaps, have been more advisable, to have waited till points, that are still doubtful, could have been accurately investigated; but, according to your request, I will report the progress of my experiments, and explain my ideas on the subject. It opens a wide and interesting field: the vegetable kingdom may certainly be greatly enriched by artificial intermixtures, and I think that new plants may be so formed, which will be capable of reproducing themselves, as distinct generations, by seed, in the same manner as natural species. I am aware of the opinion of our worthy President, who conceives that the production of a fertile offspring, from two plants of species supposed to be distinct, is in itself a decisive proof, that the parents are really of one species, and that Botanists have been in error concerning them; or, in other words, that fertility is evidence, that the plant is not really hybrid, but produced by the intermixture of two varieties of one species. I am, however, satisfied, from the progress I have already

made, that several plants, which I have raised, are not only, in the fair sense of the word, hybrid, but also fertile; and if they should perpetuate themselves by seed, without reverting to the form of either parent, they will be entitled to be considered by the Botanist as distinct species.

If it is meant only that a fertile offspring may be supposed to intimate, that the two parent plants have branched out from one common stock since the creation of the world, I am fully disposed to admit the truth of that position; but I should go much further, considering that many species, which we cannot now, by artificial means, prevail upon to intermix, have also descended from one original; and I doubt very much whether such a multiplication of distinct species may not also have taken place in the animal and insect tribes; but, to produce an intermixture between species that may have so diverged, the will of the animal must consent, while that of the plant need not be consulted.

I suspect that in the early periods of the world, there existed only the distinct genera of plants, or heads of families, not, however, exactly according to the present divisions of Botanists; who, indeed, are perpetually at variance with each other, as to the features which are sufficient to constitute a variety, a species, or a distinct genus. The lapse of centuries and diversity of soil and climate have probably wrought the most wide and permanent distinctions between vegetables, that have originated from a common stock, possibly even between the arborescent Ferns of the Andes, and the herbaceous inhabitants of our forests; but I should neither decide, if I found it impossible to produce a fertile offspring from the intermixture of any two plants, that they must have been

distinct from the commencement of the world; nor, if I did succeed in procuring it, that they must not at present rank as distinct species of vegetables; I should merely think, as the Botanist would probably have already decided, that they were referable to one genus, or family. I apprehend the whole mystery to be this; that, in the progress of the distension of genera into various species, some species have retained such affinity as to admit of easy artificial intermixture; others have preserved so little affinity as to render their union more difficult; and others have departed so widely from their prototype, that the art of man cannot now reconcile them, and that, to bring them together again, it would be necessary to tread back or reverse the process of the centuries that have worked their difference. To which may be added, that in some plants the variation may be striking in many external appearances, and yet less considerable in the parts of fructification than in other species, of which the leaf or corolla may be more similar. If it be admitted, that diversity of species could have been produced by variations of soil, temperature, or humidity, it will be readily understood that such diversity might have been further multiplied by hybrid intermixture, as the species were brought together by the natural progress of their diffusion.

Mr. KNIGHT has raised fertile Strawberries from the mixture of the Chili, the Carolina, and the Scarlet Strawberries, which some persons had deemed to be distinct. But this division was probably erroneous, for we find that they will intermingle naturally, and become confounded by seminal variations, without any artificial impregnation, and therefore it was a pretty clear case that they had been improperly

separated. On the other hand, Mr. KNIGHT has failed, as yet, of producing a fertile plant between the American and European Strawberries: but are we to conclude from that circumstance, that plants, so nearly allied as the Scarlet and Alpine Strawberries, were from the creation of the world distinct, and at the same time hold that all the African Gladioli, between which (permanently dissimilar as they are in appearance) I can raise fertile intermixtures, were originally one species? Such an opinion would be so paradoxical, that it would require to be supported by very clear proof; and yet it would be difficult, by experiments, in any manner to confirm it.

It is not even true that all mules amongst animals are entirely sterile. There are well attested instances of the fertility of the mule between the ass and the mare; and mules between the gold-finch and canary-bird, the distinction of which no naturalist could deny, are frequently known to breed; and I understand that all the more beautiful mules are produced by a second cross with the canary-bird. I have known the mule siskin couple with a canary-bird; and I understand that the mules between two very distinct birds, the common pheasant and the silver pheasant, have proved fertile. The analogy, therefore, of animals, if such could be relied on, in considering the generation of vegetables, would not completely establish fertility as the test of a common origin. The organs in mule animals are said to be perfect, and the cause of their rarely breeding is not ascertained, though it is perhaps a sluggishness of constitution, as the equine mule is said to be more fertile in warmer countries. I suspect also, that the plants which thrive in a high tempe-

rature, will intermix more readily than those of colder regions. Strawberries, especially Hautbois, in their natural state, are often sterile.

Many plants, which Botanists have considered distinct, are certainly not so; as, for instance, Ixia (or Tritonia) crocata, of which seminal varieties have been erroneously named I. squalida, I. miniata, I. fenestrata, and I. deusta; Ixia flexuosa and I. polystachya, are the same; Babiana stricta, B. villosa, B. sulphurea, and rubro-cyanea, are not distinct; I have had a natural seedling from Babiana sulphurea with a pale eye like that of B. rubro-cyanea. I raised from the natural seed of one umbel of an highly manured Red Cowslip, a Primrose, a Cowslip, and Oxlips of the usual and other colours, a Black Polyanthus, a Hose-in-Hose Cowslip, and a natural Primrose bearing its flower on a Polyanthus stalk. From the seed of that very Hose-in-Hose Cowslip, I have since raised a Hose-in-Hose Primrose. I therefore consider all these to be only local varieties, depending upon soil and situation. I have raised a powdered Auricula and a Primula Helvetica from the seed of P. nivalis; and I have raised a Primula Helvetica also from P. Viscosa. I therefore esteem these Swiss Primulas to be local varieties of one species. The Violas are proved by cultivation to have been too much divided. The great Hearts-ease, which adorns Covent Garden market, under the name of Viola grandiflora, is found all yellow in Craven in Yorkshire, under the name of Viola lutea; with large dark purple flowers, without any yellow, in the neighbourhood of Moor-rig, above the falls of the Tees, in the county of Durham; and with mixed purple and yellow flowers,

under the name of Viola amœna, in Weardale, a few miles from the last named place. The seeds gathered in Teesdale from the dark purple Hearts-ease once produced a dirty purple and yellow flower in my garden. These are therefore only local varieties, which by their uniformity in their natural abodes have misled the Botanist.

I believe the Orange, Citron, Lime, Lemon, and Shaddock, to be varieties of one plant. I do not, however, consider that Mr. KNIGHT's experiment* has proved the Almond and the Peach to be one species. The Peach is extremely similar to the Almond, with the exception of the sweet pulp, which may be, very probably, the effect of cultivation; and, if any amelioration of the pulp could be produced in seedling Almonds, I should incline to think that a long course of cultivation might have improved the Almond into a Peach. But the production of a fruit resembling a Peach, from an impregnation of the Almond with a plant so very similar, only shews that in an intermixture between two plants, which have such close affinity, the type of the male (as is frequently the case) has been very conspicuous; and this, even if the Peach had been known to have grown wild, with a sweet pulp, before the deluge, would not have surprised me.

The science of the Botanist, at the best, is very unstable, because it is entirely a science of conjecture, liable, at all times, to be overset by the test of cultivation. He carefully observes in plants the features that are least liable to variation; and by their means is enabled to subdivide the Classes, Genera, and Species of vegetables; but experience sometimes shews that the features, on which he relies, are

* Horticultural Transactions, Vol. III. page 1.

very variable. Rhododendron and Azalea belong to two classes, widely separated by the number of the anthers, which is the characteristic feature of those classes; yet they are found to breed so freely together, and accord so exactly in the seed and capsule, that it can scarcely be doubted that they have branched from one original stock. Indeed, the Azalea is reported to have been occasionally seen with ten anthers, instead of five. At the same time, I doubt the possibility of intermixing the Alpine Rhododendrons with those of Pontus, India, and America, although united in one genus.

The most distinguished Botanists are perpetually at variance with each other, as to the subdivisions of the vegetable system; nor has any precise meaning been affixed to the terms by which they are known, as a guide to their labours; and, if we ask what is an Order? What is a Genus? What is a Species? What is a Variety? We shall find the answers very unsatisfactory. The most rational interpretation of the terms, I think, will be found as follows: *An Order*,—all the genera or original stocks which have general affinities to each other, though not such as to warrant a belief that they have branched from one stock. *A Genus*, all the species which have peculiar affinities, distinguishing them from all others; and which, I think, render it probable that they have branched, since the creation of the world, from one original. *A Species*,—a race of plants that will, in the present state of the world, perpetuate itself without varying in essential particulars, so as to confound itself with any other. *A permanent* or *local Variety*,—that which will perpetuate itself in a particular form, if kept in its native soil or situation, or at a distance from all other varieties; but which would, other-

wise, confound itself with them. *An accidental Variety*,—that which cannnot with certainty be perpetuated by seed in any situation. I do not believe that a better definition for the purposes of science can be given; and, if Botanists attended to it, their classifications would not be liable to such perpetual variety and contradiction: but, at all events, the experience of the Cultivator must always have weight to supersede the conjectural decisions of the Botanist.

The colour of the flower is one of the most uncertain features; and yet, if immutable through successive generations, it is just as sound a botanical distinction as any other, whilst pubescence is a feature to which more weight is attached, and yet we sometimes find it as variable as colour. For instance, as to *Colour*, the beautiful Convolvolus varius, figured in the *Botanical Magazine** as a variety of C. purpureus, is very similar to that plant in every thing but the colour of the flower. The seedlings of C. purpureus vary with every shade of purple, red, and white, having always five spots at the mouth of the tube, but no variation of colour is ever seen in the different flowers of the same seedling. Convolvolus varius has the opposite peculiarity; the plants which I have raised, through twelve or thirteen generations, differed not in the least from each other, but it would be difficult to find two flowers upon any plant exactly alike in the marks of colour, but they never have the five spots in the tube; and the natural ground is a sulphureous white, with the inside of the tube pale purple, and the flowers are irregularly streaked with dark blue, in infinite diversity. Sometimes an accidental flower, like a run Carnation, will have

* Plate 1682.

the ground entirely blue, with streaks of a deeper colour, but no instance of a plant raised from its seed, with all its flowers alike, or spotted at the mouth of the tube, has been seen; and, therefore, it appears to be as truly a distinct species, as if it had been distinguished by any other permanent feature. Permanent colour is also a principal feature, in distinguishing the species of Anagallis. On the other hand, as to *Pubescence*, the lovely Echites suberecta, does not appear to vary in colour, but in a pot of seedlings, I have found one with the stems hairy, whilst the rest have them smooth. If that difference had been found in a wild specimen, with some variation in the colour of the flower, the Botanist would have named it a distinct species, until the experience of Cultivators had shewn the difference to be uncertain.

With respect to the fertility or barrenness of mule vegetables, there is some mystery which I cannot at present and perhaps never shall be able to develope. All the mules I have raised between the African Gladioli have proved exceedingly fertile, indeed certain of producing good seed from every flower; yet the Gladioli cardinalis, blandus, tristis, hirsutus, and recurvus, from the intermixture or which some of those mules have been produced, are plants exceedingly dissimilar to each other, and could not possibly be considered as varieties of one species. I have found no difficulty in crossing one of the mules produced from these, with any third species: but the European Gladioli (which have not winged seeds, and ought to be considered as constituting a distinct genus) have as yet refused to breed with the African sorts. On the other hand,

the hybrid Crinum Govenium, figured in the *Horticultural Transactions*,* has not produced any seed, either from impregnation with its own dust, or with that of other Crinums, although I applied that of C. speciosissimum and C. brevifolium. Its stigma was, however, quite perfect, and furnished with the usual tubular fringe, and the particles of its pollen, examined with the microscope, though not very abundant, appeared to be furnished with the viscous juice which I consider to be the proof of fertility. I did not think of examining the interior of the germen till it had begun to turn yellow, but it appeared then, as if there had been a deficiency of the embryo seeds in the germen, and therefore an incapacity of bearing seed. Next summer I shall examine the germen while it is fresh, and try whether the pollen of this hybrid Crinum will fertilize any other. If the mule Crinum should prove to have no embryo seed at all in its young germen, its apparent sterility would be at once explained.

The American Azaleas do not produce seed abundantly in this country, and one reason for this is that they are frequently entirely deficient in pollen, in consequence, perhaps, of the dryness of our atmosphere or soil in spring, compared with that of America. In the second week of last May I was desirous of impregnating Rhododendron Azaleoides, which had no pollen of its own, with that of some Azalea, but I could not find a single Azalea flower that had any pollen. I touched its stigma therefore with the dust of Rhododendron Catawbiense. The capsules swelled, and in August they appeared in fair progress to ripen the seed, but owing to the extraordinary drought (the plant not having been

* Vol. III. page 187.

watered) the pods fell off; but they had remained on long enough to shew that the germen had been apparently fertilized; those to whose stigma the dust had not been applied, having withered long before. From this it should seem that the ovarium is not defective in that mule, and that it would probably be fertile in America. My own mule Rhododendrons have pollen, though not abundant, and I think I should have obtained seed from them this year, if their roots had not been injured by two much water in the pots.

I suspect that the germen is very speedily fertilized when the dust has touched the stigma; but I doubt whether, after being fecundated, it is closed against any further impression. I have a pot full of seedlings from a pod of Crinum Capense, of which the stigma was touched first with the dust of C. erubescens, and several days after with that of C. scaberrimum; and by their present appearance I think they are intermediate between the mules produced by the dust of either separately; but it is impossible yet to speak with confidence. Mr. KNIGHT has assured me that by touching the stigma of a smooth Cabbage with the dusts of a curled and of a red Cabbage, he had given both the curl and the red colour to the seedlings; but I am uncertain whether both dusts were applied at the same time. It would be very desirable to ascertain by experiments how long after the stigma had been touched with pollen, a second impression could be given. The summer before last I wished to try the possibility of crossing a plant of Pancratium litorale which had twenty-one buds on a stem, with Crinum,* Nerine,

* See Botanical Magazine, 2113, and 2124.

and Coburgia. The first flower had expanded before I had taken out its anthers, and though I could not distinguish any dust on its stigma, wishing to make my experiments with certainty, I immediately cut the flower off so low, as even to take off the summit of the germen, which I thought I had destroyed, the embryo seeds being partially exposed. The anthers were successively taken out of the twenty other buds, to which various uncongenial dusts were applied in vain; and the only seeds produced were from the germen of the flower which I had so cut off, and I raised true plants of Pancratium litorale from them. This proves the fecundation to have been speedily effected, unless the germen could have been fertilized by dust having actually fallen into it accidentally when I cut off the flower. I have been unsuccessful in obtaining mule Convolvoluses, Hibiscuses, and Turneras, and I attribute this to some difficulty in ascertaining the right moment for impregnating fugacious flowers. I have opened the buds before expansion, to take out their anthers, but the result has been a failure of seed. I did raise one mule between the red American Convolvolus sepium and Convolvolus candidans, but it was very weakly, and died.

Last summer I took the anthers out of two flowers of Alstræmeria pelegrina and touched their stigmas with the dust of a white seedling variety of the same species which stood by it, and those two were the only flowers of either of the plants which failed to produce seed. I can only explain this circumstance, by supposing that the stigmas when touched might not have been come to maturity, and that the dust upon them might have become too dry

to have any effect before the stigmas were ready to receive its impression.

I believe it is an error to imagine that pollen will always retain its fertilizing powers for months, if kept dry; on the contrary, I have found it quickly lose its virtue entirely so the moment it became dry. The pollen consists of minute vesicles filled with a juice which is very visible by means of a microscope. The vesicles soon become dry, and though they retain their form, no juice can then be pressed from them; nor have I ever obtained seed by means of any dust that was not fresh from the flower.

In an attempt to fecundate the English Heaths with the dust of the African sorts, I was defeated by finding that the dust was shed upon the stigmas so long before the flowers expanded, that the anthers could not be taken out effectually without cutting into the bud at so early a period as to destroy its growth. The most likely cross would have been Erica cerinthoides with the dust of our E. tetralix, but E. cerinthoides does not make seed at all with me. I found the same difficulty with the Crocusses. The African tubular Heaths, on the contrary, do not cast their dust at all, unless the anthers are touched by a pin or the proboscis of a strong insect, which makes them spring asunder. I have therefore been able to obtain mules from them without taking out the anthers. It has been conceived that the African Heaths consist of different genera, which might be distinguished by the shape of their pods: but I have found no difficulty in intermingling species with different shaped pods, which proves that such a division would be erroneous; and I am

quite satisfied that it is unsafe to rely upon the outward shape of the ripe capsule as a generic distinction when its internal structure and the form of the seeds agree. I have mules from the long-podded Erica ampullacea and E. Jasminiflora with the round-podded E. vestita-coccinea and E. hybrida or cylindrica. I have also mules from E. Shannonia with E. gemmifera and with E. tricolor, of E. ampuliacea with E. gemmifera, and all the seedlings of a similar impregnation are alike amongst themselves, and would at once be pointed out, by a person acquainted with the African Heaths, as new species extremely unlike their parents. These have not yet flowered. I have not yet obtained any mule between tubular and campanulate flowering Heaths, but I have not made many attempts. I think such difference of form much more likely to constitute a true generic distinction in the family of Heaths than that of a longer or rounder capsule. The unwillingness of the African Heaths to shed their dust, unless touched by a strong insect or humming bird, must render them very likely to be fecundated by the dust of neighbouring sorts: and if the hybrid offspring should prove fertile, like that of the Gladioli, it will be evident how it comes to pass that the species of African Heaths are so multiplied, whilst the European sorts continue unalterable. I am confirmed in this view by the information I have received, that the different African species are very local, and not at all diffused over the face of the country.

Seeds, as it is well known, are originally existing in the germen, and during the time of the expansion of the flower, as the stigma advances to maturity, which often takes many

days, the germen and seeds continue to grow, and in some genera they increase exceedingly in size before the stigma becomes perfect, soon after which period the germen generally ceases to grow, and, unless it receives the congenial dust, it will fail. The difficulty is to explain how the seed can have power to draw from the plant the nourishment which is necessary for its growth, to a certain point, and yet be unable to continue to derive the support which is requisite for bringing it to maturity. I suspect the fact to be, that as long as the style remains fresh, the seed receives a portion of its nourishment by a return of sap from the style, and stigma; and thus continues to advance rapidly in growth, without any fecundation: but I apprehend that, during that period, it is only that part of the seed, which is to form the cotyledon, or seedling leaf, that grows, and that the actual germ of the young plant does not exist completely till after the fecundation of the stigma, when I conceive it to be actually formed by an union of the substance transmitted through the vessels of the style, and that which was already within the cotyledon, and thus to partake of the type of both parents. If the fecundation only gave the embryo a stimulus to excite it to draw nourishment, as I have heard suggested, the type of the male would not be conspicuous, as it is in the offspring, nor do I see how it could at all be impressed. I am led to this opinion the more, by finding that seeds apparently perfect, may be produced where the stigma has not been touched with pollen, or with pollen from a plant not sufficiently allied; but that on opening such seeds, there is a total deficiency of the germ, the seed being an inert lump, which cannot vegetate. The sprout or germ in the fleshy green

seeds of Crinum, Nerine, and the true, or occidental Pancratium (for those of* Europe, and Teneriffe are a distinct genus, with small black seeds, like Narcissus) is like a sharp skewer lying in a narrow cavity, and as it grows, the sharp pointed end pierces the fleshy substance of the cotyledon, and entering into the earth it deposits at its point the young bulb into the ground, at some distance from the seed; nor can it be conjectured from the outward appearance, on which side of the seed the sprout will issue. I have had from Nerine (Amaryllis) undulata seeds even of unusual size, though not always exactly of the natural form, when the stigma had been deprived of all the pollen, but they never vegetated; and after a certain period, they turned yellow and decayed. In like manner I have been repeatedly deceived, by imagining I had obtained hybrid seed, having

* I do not think there would be any chance of obtaining mules between the occidental Pancratiums, and those of Europe, Teneriffe, and Asia. The European sorts might perhaps breed with the Asiatic P. Triflorum. (Verecundum of the *Botanical Register*, Plate 413) which has from twelve to thirteen small round seeds in each cell of the young germen, that are probably similar to those of the European kinds. It is very singular, that although that plant is abundant, and apparently indigenous, in Bengal, it has not been known to ripen its seed there. I can only account for this, by supposing it to be a native of shady hills to the North, from whence its seeds may be brought down into the meadows of Bengal by the floods. I mentioned in a former communication † the difficulty attending its culture here. I have since succeeded in flowering it with certainty, by leaving the bulbs dry during part of the winter, and starting them in a warm but completely shaded situation, early in the spring, when the flower stems and leaves sprout together. It will not, at any period of the year, bear exposure to the sun.

† Horticultural Transactions, Vol. III. p. 190, note.

touched its stigma with dust from plants of other genera; but finding them always fail, I cut several open as soon as they were ripe, and instead of the sharp pointed sprout within, I found an empty cavity where it should have been placed. It appears therefore that the cotyledon of the seed may be brought to tolerable perfection without fecundation, but that the germ of the seed will not be formed without the quickening dust of the male. In the same manner, I apprehend, that the egg of a bird, which has not been fecundated, contains all that is analogous to the cotyledon, and serviceable for the support of the embryo in its earliest stage; but that the embryo itself is not completely formed, from want of the union of another requisite substance.

I have lately had an opportunity of observing what appears to me to be a singular phenomenon in nature. Having had reasons to consider, that the plant, known and figured in the *Botanical Magazine* (Plate 1419), as Pancratium Amboinense, belonged to a distinct genus, I was anxious to see its seeds, which had never been perfected with me; and I had written to a friend at Calcutta, to request that he would send me the perfect capsule and ripe seeds. I received for answer, that the plant never produced seed at Calcutta, but that Dr. ROXBURGH had once seen it; and from some resemblance to that of Crinum, he had called the plant Crinum nervosum, in the *Hortus Bengalensis*. I had, however, this autumn, an opportunity of seeing the seed, from a bulb I had given to Lord MILTON, which stood on a back flue in a very shaded situation; and to my great surprise, instead of real seeds, it had produced perfect tunicated

bulbs. The flower stem was unfortunately broken off by an accident before the capsule appeared to be quite ripe; and on opening it three bulbs were taken out by Lord Milton's Botanic Gardener, Mr. Cooper, who supposed them to be seeds not perfectly mature, and laid them (as I had generally advised him to do with Crinum and Pancratium seeds) on the surface of the mould in the pot of the parent plant. I regret exceedingly not having had the opportunity of opening the capsule myself, but Mr. Cooper, on whose accuracy and intelligence I have found every reason to depend, asserted positively, that there was no other body in the seed vessel (for I suspected that the bulbs must have been attached to withered seeds, that had sprouted prematurely in the capsule), and that the three bulbs were placed exactly in the usual manner of seeds, for which he had mistaken them. Lying in my stove upon the earth, they soon struck fibres into it, as a common Hyacinth bulb would have done; and after some time, a young leaf sprouted out from the centre. The only peculiarity in which these little bulbs differed from offsets was, that the two outer coats were split on one side; I pulled off the outer coat of one of them, without injuring it, and it has sprouted since; and (which is very remarkable,) another of them, before it sprouted, produced within the outer coat, which shrivelled, an offset as big as itself; or rather, it divided itself into two twin bulbs of equal size, as old bulbous roots often do.

The annexed figures represent the young bulbs above described. 1. is the bulb as first taken from the capsule. 2. the same after it had vegetated, the outer coat having

been stripped off sometime before, for the purpose of examining it; and 3, is another just beginning to sprout, containing twin bulbs within the outer coat, which is withered.

This is the first instance I have known, or heard, of an embryo, either in the vegetable or animal kingdom, drawing its support directly from the parent, without the intervention and assistance of an intermediate body, such as the cotyledon, the yolk of the egg, or the placenta, to afford it nourishment. I have indeed found one Oxalis from the Cape of Good Hope (very much resembling, if not the same as, the Oxalis glandulitega of the *Paradisus Londinensis*, Plate 66) to be viviparous; but in that plant the young germ is furnished with the usual cotyledon, though the seedling leaves are fully expanded when the seed (which is ejected, like that of Balsams, by a jerk) falls upon the ground; that amounts, therefore, only to a habit of premature vegetation in the seed, and

is not at all analogous to the singular production of perfect tunicated bulbs in the seed-vessel without the intervention of any alimentary seminal substance. The plant hitherto called Pancratium Amboinense has never manifested any disposition to bear bulbs on the stem or leaf, like some Liliums; nor, as far as I know, has any instance been observed of such plants as are otherwise bulbiferous, producing bulbs within the seed vessel.

The particles of the pollen of Amaryllis, Crinum, &c. seen through the microscope, are vesicles in form like Cucumber seeds, but more plump, and less acute. The stigma of Amaryllis proper* is covered with long, slender, transparent tubes; that of most Crinums with short conical tubes, exactly like miniature cones of a volcano. By these, the vesicles of pollen are arrested; and, from the manner in which I have seen torn and empty vesicles adhering to them, I suspect that, by some power of contraction, the tubes may break them; but at all events the particles are full of a clear liquid, which looks, in the microscope, like the finest white honey, and it seems that this liquor must be conveyed by the tubes into the style, and through its vessels to the seeds, which are severally attached; by a sort of umbilical chord, to its base. I attempted, by examining transverse sections of the styles of Crinum and Amaryllis in the microscope, to ascertain whether there were three separate communications from the three lobes or corners of the stigma to the three cells of the seed vessel; but I could not discern *any* communication, the whole appearing to be a spongy substance, so minutely reticulated, that its pores could not be clearly de-

* See Botanical Magazine, Plate 2113.

fined by my strongest magnifiers. Perhaps the examination of styles in a drier state, especially the larger styles of Liliums, may furnish a more satisfactory result. It is possible that the very minute vessels in the style will only permit the passage of such particles of pollen, as agree in shape with the vessels themselves; and that by such a wise precaution the dust of plants, which are not closely allied, may be excluded from fecundating the seed. It might be easily ascertained, by cutting off two of the lobes of the stigma of Gladiolus, whether the one remaining would be able to fertilize the whole seed-vessel, or only one of its cells; and even by cutting off part of that lobe, whether the remaining half would fertilize all the seeds in a cell, or only a portion of them. I do not believe it has been ever ascertained with respect to the plants that vary most from seed, as, for instance, Larkspurs, whether varieties of different colour are produced from seeds that lie in the same cell of the capsule.

A late observation gives me further reason to suppose that a second impression may be conveyed to the seed, and that dust falling upon different parts of the stigma, may fertilize different seeds, probably in different cells. Having been absent from home the second week of August last, I had directed my gardener to take the anthers out of three flowers on a weak stem of a seedling Crinum Capense, and to impregnate the first with the dust of C. brevifolium, the two latter with that of C. defixum. This was done accordingly, but he had neglected to take the anthers out of the latter flowers before their expansion, and a little of the pollen came off upon his fingers, though he trusted that none had touched

the stigma. On my return home the day after the last flower had been touched with the dust of C. defixum, having an opportunity of using the pollen of C. speciosissimum, I superadded it on the stigma of the last blown flower, which alone was still fresh. The three flowers produced seed; and the result is, that those of the first pod, which were impregnated with C. brevifolium, have produced plants quite distinct, but like to each other, with bright green leaves, deeply channelled quite to their point; whereas natural seedlings of C. Capense have their leaves glaucous, and flat on the inner side, without any channel. The second pod contained only four large seeds, of which one has not yet vegetated, and perhaps will be found to contain no germ; the other three seeds produced plants, of which two are bright green, so roundly channelled near the base, as almost to form a hollow cylinder by the meeting of their margins, but they become flat near their points, and are undoubtedly the hybrid offspring of C. defixum; but the third plant has flat glaucous leaves, and appears to be a natural C. Capense, produced in the same capsule by some particle of the dust that had escaped: as the pods of Crinum become one-celled before maturity, it could not be ascertained whether these seeds were formed in different cells originally or not. The last capsule has produced three green seedlings, channelled near the base only, but much less so than the former; also five or six very slender and weakly plants with flat green leaves; and one vigorous plant, with leaves coming nearer to the natural appearance of C. Capense. It is therefore pretty evident that different sorts of dust can act upon one capsule.*

* February 18, 1820. The mule Crinums raised last September, having been

There are above forty known species of Crinum, with considerable diversity of form, stature, and colour; and I have reason to think that C. Capense will not refuse to breed with any of them, as it mixes indifferently with those that have spherical or columnar bulbs, reflected and radiate or more companulate corollas; and if joint impressions can be con-

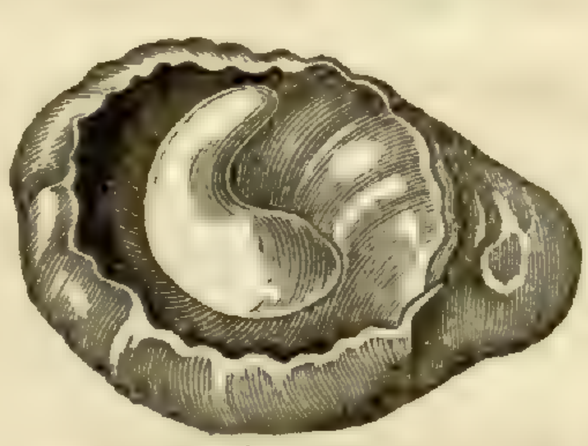
recently singled out and examined, I am enabled to state some farther particulars concerning them. Those from pod 1, Crinum brevifolio-Capense, are quite uniform, and have formed no spherical bulb under ground, but have the slender columnar stem of the male parent. From pod 2, the two seedlings that were evidently Crinum defixo-Capense, thrive fast, as above described, and have formed small bulbs, in which respect they also conform with their male parent; the third seedling, which had the semblance of a natural glaucous Crinum Capense, retains that appearance, the young bulb having split into two plants (in the same manner as the young Pancratium Amboinense mentioned before), but both are very weakly. From pod 3, the three first noticed seedlings are vigorous, and decidedly Crinum speciosissimo-Capense, and conformably with the habit of the male parent, have acquired minutely scabrous margins to their leaves, and have already formed bulbs as big as a goldfinch's egg; the seedling, described as being vigorous, apparently a natural Crinum Capense, thrives also well; but the other plants from that capsule, became like natural seedlings of Crinum Capense, though they were very weak, and all died in the winter except two, which are still very small and slender; it looks as if the small quantity of the natural pollen which must have fallen upon the stigma, had conveyed its main impression to one seed, and barely supplied to the other seeds the basis of life, but not in sufficient quantity to enable them to germinate with vigour. The fourth seed in the second capsule of Crinum Capense impregnated by Crinum defixum, on examination this morning, proved, as I had conjectured, to be empty, and furnished with no germ or embryo. I have sent it, together with a natural seed of Crinum defixum to shew the proper form and position of the germ, to the Society; it appears to me that this maturation of all that part of the ovula, which is necessary for the support of the embryo, without the existence of the embryo plant itself, when the congenial pollen had been wanting, is an

veyed, as seems to be the case, by blending the pollen of different sorts, the variety of produce may be almost incalculable.

I mentioned in a former communication,* that I had obtained a mule between Crinum Capense and Pancratium distichum; but I have since looked upon the plant with great suspicion, because I have never before or since succeeded in intermingling species of these two genera, which I considered fundamentally distinct, according to my own division

important point in the natural history of the formation of all living things, and, as far as I know, heretofore only observed amongst birds.

1



2

3

No. 1. of the above figures represents a section of the mule seed of Crinum Capense, wanting the internal germ or embryo; No. 2, represents the natural seed of Crinum defixum cut open, to shew the position and form of the germ, and No. 3, is the figure of the germ taken out of the seed. I may take this opportunity of mentioning, that seeds of Crinums, especially the African Crinum giganteum,† though large and firm when gathered, become soon after soft and mouldy in the driest atmosphere. I have discovered that this circumstance was owing to their having been insufficiently ripened, and have stopped the progress of the decay, either by laying them in the shade upon moist earth, or on a pot of moist sand upon the flue, covering them for a time with a glass, by which means I at last succeeded in obtaining a seedling from Crinum giganteum.

* Horticultural Transactions, Vol. III. page 196.

† Botanist's Repository, Plate 169. Amaryllis ornata β. of the Botanical Magazine, Plate 923*.

of the Amaryllideæ, as given in the *Botanical Magazine*,* and I am now persuaded, from the appearance of the plant, that the seed must have been fertilized several days after the application of the dust of Pancratium, by the accidental escape of the dust of Crinum canaliculatum.

I was desirous, last August, of impregnating a mule Gladiolus with the dust of Watsonia fulgens and of Amaryllis crocata, thinking that the true occidental Amaryllises were, from the form of their stigma, capsule, and seeds, more likely to breed with Gladiolus, than with those species of the Crinum family, which have been confounded with them under the name of Amaryllis. The Gladioli in pots having done flowering, I chose the two last flowers that remained to expand in the open borders, having destroyed the buds that immediately preceded them, so that at the time of their expansion, there was no other fresh Gladiolus flower, nor any appearance of fresh pollen in the garden. The result is, that both flowers produced small distorted pods, containing a few seemingly good seeds. I have sown them; but I expect to find that they were fecundated by some particles of Gladiolus dust, from the half withered flowers, brought by the wind or bees, because I have no expectation of being able to intermix genera which are really distinct, and the experiment was made with a view to a negative † result.

* Botanical Magazine, 2113, 2121, and 2124.

† February 9, 1820. The various mule Gladiolus seeds obtained last summer, were sown in separate pots, and placed in the stove All except those supposed to have been produced by the dust of Watsonia and Amaryllis, sprouted long ago; three or four of those from Watsonia began to grow sometime after; but

An idea is somehow prevalent, that if vegetable mules are fertile, their offspring will revert to the similitude of the original female parent. This appears extremely improbable, and, if true, almost inexplicable; I have not yet flowered a sufficient number of seedlings from mules to speak confidently from experience, but I have no reason, as yet, for believing it. The only one of my seedlings from Johnson's Amaryllis Reginæ-vittata, which has yet flowered, was in every point precisely similar to its hybrid parent, which seems thereby to perpetuate itself as a distinct species. Great caution will be necessary with respect to the supposition of seedlings from mules reverting to the likeness of the original parent, because it is quite certain, that mules which are fertile may be fecundated by the dust of either, and especially of the female, parent; and, if it is at all within reach, the dust may be brought, unperceived, by the wind or insects. The bees were so busy last summer amongst the different Gladioli that were growing in the same quarter of my garden, that if some of the seedlings from my mules were to appear like the original female parent, I should have no confidence that they might not have been accidentally fecundated by its dust, especially as the stigma of Gladiolus begins to expand before its anthers.

those from Amaryllis continued dormant, in four separate pots, till yesterday, when one seedling made its appearance, and the other seeds appear to be in motion. The seedlings are all in too young a state to judge from appearance of their parentage; but if the last should prove to have been produced by the dust of withered Gladiolus flowers, brought by the wind, it will seem that such obsolete pollen produces not only imperfect pods, but seeds, of which the vegetation will be more tardy.

Mules are not often produced naturally, at least in Europe, (except in gardens, where plants are brought together, which could not otherwise have mingled) perhaps because all the combinations that were likely to occur in the native situations, have been made centuries ago, and have taken their place in the catalogue of species; whereas local species, which may have been produced by diversity of soil or climate, are often brought in contact by cultivation. The only sterile mule, in a wild state, of which I have heard, is Centaurea hybrida, which grows upon a hill close to Turin, where it is supposed to be produced by the frequent intermixture of two species of Centaurea, and to bear no seed itself. Ranunculus lacerus, also sterile, has been produced accidentally at Grenoble, and I believe near Paris, by the union of two Ranunculi; but this occurred in gardens. I cannot learn that any attempt has been made to touch their stigmas with their own dust, or that of one of their respective parents; or to ascertain whether there is any deficiency in the pollen or ovarium.

I have already mentioned that the stigma of Liliaceous plants is furnished with a fringe of transparent tubes, by which the juice of their own dust is probably taken in; but I have occasionally observed in Crinums one or two such tubes on the side of the style, and even close to its base, which is concealed within the long tube of the flower: and I see no reason to doubt the possibility of the germen being fecundated through their means, if the stigma were cut off, and the liquor expressed from the dust were to reach them. On examination of the flower of Morea tricuspis in a microscope, I discovered, near the base of the opposite petal,

exactly such tubes, as the part which is called the stigma in Iris and Morea appears to be furnished with ; and it seemed to me that, in that flower, all the more substantial part of the corolla might be considered as acting the part of a style.

The genus Crinum lends itself most willingly to the production of mules. In addition to C. Govenium * or Zeylanico-Capense, C. erubescente-Capense, and C. scaberrimo-Capense, before mentioned,† I have now C. brevifolio-Capense; C. defixo-Capense ; C. speciosissimo-Capense ; C. toxicario-Capense ? C. Americano-erubescens ; C. Americano-brevifolium ; C. cruento-erubescens ; and C. exaltato-scaberrimum ; which last will probably surpass the whole genus in beauty, as C. exaltatum (allied to C. pedunculatum) is loftier than C. amabile, and bears forty white flowers, while C. scaberrimum has decidedly the finest individual flowers of the genus, though they are not usually numerous; unfortunately, I have not yet had any plant of C. Capense in flower at the same moment with C. amabile, and therefore have not been able to attempt a mixture between them.

I have many seedlings from Johnson's mule Amaryllis Reginæ-vittata, and I have some mule A. equestri-vittata,

* Crinum Govenium has very short peduncles, but they are not visible without tearing off the spathe, which sits remarkably tight; the right name of its male parent, (Amaryllis ornata of the *Botanical Magazine*, Plate 1171) is Crinum Zeylanicum, and not, as I before stated, C. Moluccanum. The confusion arose, from Dr. Roxburgh's having annexed a drawing of C. Moluccanum to his description of C. Zeylanicum, and the bulbs having been sent repeatedly from Calcutta, under the wrong name; Mr. Ker's quotation ‡ in the Journal of Science and Arts is therefore right.

† See Horticultural Transactions, Vol III. page 196.

‡ See Horticultural Transactions, Vol. III. pages 189 and 190.

superior to Johnson's flower, in size and colour, with the longer tube of A. equestris. They make seed pretty freely, and I obtained a further cross by impregnating one of them with the pollen of A. rutila and A. fulgida. The bulb of A. rutila and A. fulgida is always surrounded by a crown of blind offsets, and the mule seedlings obtained from their dust began at five or six months old, to produce young bulbs, and every one of them has now several strong offsets adhering to the bulb; these will be a valuable acquisition.* I have

* February 18, 1820. Twenty-four bulbs having been lately sent by me to the Society, each being an offset from a different seedling of a mule Amaryllis equestri-vittata, crossed again with A. rutila and A. fulgida, I think it desirable to give a more particular account of them, as, from their rapid growth and increase, their free habit, and probable beauty of blossom, they are likely to become favourites in every collection, and to supplant A. crocata and A. equestris, which, though they thrive in a cool stove, appear equally impatient of too much heat and too much cold.

In March 1818, being desirous at all events of obtaining some seed from a splendid scarlet and white mule A. equestri-vittata, I touched the stigma of its four flowers with the dust of A. rutila and A. fulgida. I believe all the stigmas were touched with the pollen of both, but to one or two the dust of A. rutila was applied a day before that of A. fulgida, and the others were touched first with that of A. fulgida. The anthers had not been taken out, and before the flowers withered, the natural dust of the plant was purposely superadded, to make more sure of ascertaining whether the plant was fertile. Four capsules were ripened, each being furnished with three cells. The seeds of each cell were kept distinct, and sown in April. They vegetated vigorously, and in a few months they began to shew evidently the type of A. fulgida and A. rutila, by the production of offsets. On their examination, a few days ago, they had all, with the exception of one plant, from five to above twenty offsets. The seedling, which has no offsets, is unlike the rest, and has clearly the leaf of A. equestri-vittata simply, and must be the only seedling produced by the subsequent addition of the natural pollen. It was raised from the same cell with others that shew the type of either A. rutila or A. fulgida. I apprehend that

seedlings of A. rutila with the dust of A. fulgida, approaching as nearly as possible to the A. miniata of the *Botanical Magazine*, (Plate 1943), which is not, however, that of Ruiz and Pavon.* I have also seedlings from A. fulgida with A. rutila, and from A. Reginæ with A. crocata. Seedlings of A. rutila, of A. crocata, and of Cyrtanthus purpureus, (which has been called A. purpurea,) have flowered with me at little more than two years old. Seedlings of A. vittata do not flower till they are at least seven or eight years old; but that from the mule A. Reginæ-vittata flowered at the intermediate age of three years and a half, which is worthy of note, as it appears to be an intermediate specific habit. African Gladioli will flower often the second season from the seed; Sparaxides and Ixias frequently the first, and then stronger than when the roots are older. I have had a seedling Sparaxis produce nearly forty flowers on a strong branching stem, at nine months from the sowing of the seed.

Of Gladioli I possess the following mules; G. blando-cardinalis, G. cardinali-blandus, G. angusto-blandus, G. tristiblandus, G. floribundo-blandus; G. cardinali-angusto-blandus; G. tristi-hirsutus; G. ringenti-tristis, and G. versicolore-hirsutus. I have this year seeds from further intermixtures, and mules may probably be obtained with endless variety of colour. These mules flower most beautifully in

those amongst the seedlings which have a strong purple stain at the base of the leaves, will prove to be the offspring of A. fulgida, though some may perhaps have partaken of a joint impression. Plants with green and with purple stained leaves have proceeded from the same cells, those with green leaves are probably the offspring of A. rutila.

* Flora Peruviana, Vol. III. page 57.

the open border, in a mixture of sand and peat, in patches amongst the Azaleas. It is perhaps best to take up the bulbs, and dry them, when the seed is ripe; but I have left African Gladioli unmoved for several years, in the border. I have never seen the least approximation to each other in the natural seedlings of G. blandus, G. tristis, G. cardinalis, G. hirsutus, and G. recurvus.

The only mule Pancratium I have raised, is between P. rotatum and P. distichum; I had about a dozen very fine seeds, but only one vegetated, and the rest, though above an inch in length, proved to have no germ.

Besides the mule Rhododendron, figured in the *Botanical Register* (Plate 195,) I have two that were produced by the accidental fecundation of a white-flowered Azalea by the dust of a Rhododendron Ponticum, that stood by it: one of these has produced fragrant whitish flowers very abundantly, having generally nine but occasionally ten or eight anthers. I distinguish it by the name of Rhododendron hybridum enneandron. I raised, three years ago, twenty-four plants from Rhododendron Ponticum, touched with the dust of Azalea Pontica, the plants having been forced in the stove, to make the experiment certain; but the seedlings were very weakly, and all died before the winter. I have young seedlings since raised, which should be mules; but I cannot rely upon them, because the dust of Rhododendrons is often carried by the wind to a great distance.

I have a very ornamental mule Oenothera from Oe. glauca, and (if my memorandum is right) Oe. suffruticosa, which produces seed and seedlings like itself.

I have not made many experiments with Passion-flowers,

but I think that several of them would intermix; perhaps the purple-fruited Passiflora edulis, and the scarlet P. princeps, with the hardy P. cærulea: this I intend to try next year.

Many species of Pelargoniums are known to intermix freely, and can scarcely be kept distinct in their generations. I found no difficulty in blending even the simple-leaved P. lanceolatum with P. citronodorum; but I have failed in every attempt to intermix them with either P. tricolor or P. zonale. The beautiful mule known by the name of P. ignescens, which derived its fine colour from the dust of P. fulgens, appears to be generally sterile, but I am told that it has produced a few seeds, probably from the pollen of another plant. P. ardens, though figured in Loddiges' *Botanical Cabinet*,* as a native of the Cape of Good Hope, is known to have been produced in England from an intermixture of P. lobatum and P. fulgens. In the same book Johnson's mule Amaryllis Reginæ-vittata is also unaccountably represented † as a foreign species, under the name of A. spectabilis.

Much yet remains to be ascertained on the subject of hybrid intermixtures, and the propagation of new mules offers an interesting and inexhaustible source of amusement. I think that I could even make some of the natural species, by attending to their affinities; for instance, I think I could produce the curious Gladiolus quadrangularis (or abbreviatus) by an intermixture of G. tristis and G. Cunonius; and I have produced a plant hardly distinguishable from G. versicolor, by the union of G. tristis and G. hirsutus. I have a natural, though I believe unrecorded, Australian species of Goodia,

* Vol. II. Plate 139. † Vol. II. Plate 159.

Gladiolus
tristi-biradus.

G. tristi-blandus.

G. magnifi-tristis

(which I call intermedia) so exactly intermediate between G. lotifolia and G. pubescens, that I cannot doubt the possibility of obtaining a similar plant by their intermixture.

An attention to hybrid productions will be found to confirm the general accuracy of the Linnean system, while it will tend to correct many errors that have been made by Botanists, and shew the necessity of paying greater attention in the classification of plants to the seed and internal structure of the capsule.

The figures of Gladiolus tristi-hirsutus, G. tristi-blandus, and G. ringente-tristis, annexed hereto, will afford a specimen of what may be done in hybrid productions, but I have later mules of the same genus, more exquisitely speckled, and with higher colours. Those which have been blended with Gladiolus cardinalis are amongst the most beautiful and conspicuous plants in my garden, and produce a blaze of bloom in the American borders, after the Rhododendrons and Azaleas are passed.

I hope that this report of the progress of my experiments, however imperfect, may throw some light upon the mysteries of the vegetable kingdom. I must refer those who may wish to intermingle species of Amaryllideæ to my division of the genera, in the forty-seventh Volume of the *Botanical Magazine*, now publishing.

I am, dear Sir,

Yours very truly,

WILLIAM HERBERT.

Spofforth, November 29, 1819.

POSTSCRIPT.

I have omitted to state the few observations I had made respecting the prevalence of the male or female type in hybrid vegetables. It appears that where there is a difference between the anthers and filaments of the parents, the mule may be expected to follow the male in that respect; and on the other hand, where the distinction lies in the style or stigma, I believe that that part of the mule will be found conformable to the female parent. Amaryllis Reginæ has the stigma less divided and more clavate than any other known Amaryllis; the mule Amaryllis Reginæ-vittata has the more trifid stigma of A. vittata, the female. I have seen no other mules from plants which differed in the form of the stigma or style. The mules raised from Azalea, impregnated by Rhododendron, have the ten anthers of Rhododendron, the male, or nearly that number. The hybrid Crinum Govenium has the filaments curved, like those of C. Zeylanicum, the male, which are much more bent than those of C. Capense, the female, parent. The filaments of A. fulgida are in pairs of three lengths; those of A. rutila, a species closely allied to it, are, like those of A. Reginæ, more irregular, sometimes of four different lengths, and sometimes of only two alternately. The mules from A. rutila impregnated by A. fulgida, have the filaments in three pairs, like their male parent. The form and colour of the leaves and corolla in mules, appear to be generally intermediate, partaking of the habits of both parents, and probably uniform or variable, according as they are more or less apt to produce seminal varieties. In the

genera Crinum and Amaryllis, the bulb of the mule appears to take strongly after the male in form and colour; the lower part of the leaves also takes the colour of the male: and in Gladiolus the sheath that incloses the bottom of the leaves and stalk, seems always to follow the marking of the male species. I have as yet seen nothing that militates against these observations; and I think there will be found a prevailing, though probably not an invariable, disposition amongst hybrid vegetables, to conform with such laws.

With respect to the fertility of mule plants, I am disposed to think that where there is a marked difference in the form of the corolla of the parents, the mules will be sterile, and that where the distinction lies in the leaves, in the colour of the flower, in pubescence, and other such particulars, the offspring will be fertile. The genus Crinum consists of three divisions, those with narrow radiate or reflected petals, as C. toxicarium; those with broader and more companulate petals, like C. giganteum: and those with a funnel-shaped corolla, like C. Capense; C. Americanum being, however, intermediate between the two former divisions, and C. flaccidum between the two latter. I imagine that although all the species of Crinum may breed together, the mules produced between plants with the campanulate corolla, and those of either of the two other divisions, will be sterile. The difference of stigma in Amaryllis Reginæ and A. vittata has not however occasioned sterility in the plants produced by their union. The ovarium and even the cells of the germen of the superb Crinum amabile are so imperfect, that it appears, if not absolutely incapable, at least very unlikely to produce seed often, and I have no knowledge of its ever

Mo. Bot. Garden,
1897.

having done so. Its pollen, examined in the microscope, does not shew much appearance of being prolific. In the germen of one of its flowers, although two of the cells were completely abortive, I did find one ovulum tolerably perfect, but ill-formed, and it is therefore possible that it may occasionally produce a seed ; but I am confirmed in a suspicion which I entertained on the first sight of its inflorescence, that it is a natural mule produced in Sumatra, between a campanulate and a radiate Crinum : I should have said, without hesitation, between Crinum toxicarium or C. Sumatranum and Crinum Zeylanicum, (especially as it shews faintly the red point to the youngest leaf, which distinguishes C. Zeylanicum,) if its flowers had not been longer and of a deeper purple, than such an union would appear likely to produce; but perhaps the size and colour of its flowers may have been occasioned by some favourable circumstances of soil and climate; or the male parent may be an unknown species, superior in those points to C. Zeylanicum. I also strongly suspect that Crinum longiflorum,* (which is Amaryllis longifolia var. longiflora of the *Botanical Register*, Plate 303), is also a hybrid plant, produced from C. Capense, which, I believe, is naturalized in Demerara, as the Cape-coast sorts are near Rio Janeiro; in leaf and stem, it is scarcely distinguishable from the seedling mules between C. erubescens and C. Capense. I should have very little doubt of producing a plant very like C. amabile, though with shorter and paler flowers, by impregnating any of the tall columnar white Crinums with the dust of C. Zeylanicum, but I think it would be sterile.

* See the Enumeratio Specierum of the genus Crinum, Botanical Magazine, 2121.

VI. *Notices of Communications to the* Horticultural Society, *between November* 1st, 1818, *and May* 1st, 1819, *of which separate Accounts have not been published in its Transactions. Extracted from the Minute Books and Papers of the Society.*

November 3rd, 1818. Twenty-six boxes, containing upwards of three hundred specimens of *wax models* of the most approved fruits grown in Germany, were this day presented by His Royal Highness the Grand Duke of Saxe Weimar, to the Society. This very valuable and curious collection will be arranged in cabinets, in the Meeting Room of the Society. It consists of 104 Apples, 104 Pears, 39 Cherries, 35 Plums, 15 Peaches, 4 Apricots, 1 Nut, and 1 Medlar.

At the same Meeting. A communication from Mr. John Maher was read, stating the advantages he had derived, in the late dry and hot summer, in the gardens of Arundel Castle, in Sussex, from covering the ground with tiles, to protect young vegetables from the effects of the excessive heat. He sowed his seeds in drills, and covered the intervals between the drills with tiles, letting the edge of the tiles approach within an inch of the drills, and pressing them close into the earth. The tiles effectually preserved the roots from the scorching rays of the sun, and by preventing the evaporation of the moisture under them, afforded support as well as protection.

At the same Meeting. Mr. Stephen Jeeves exhibited two *Bottle Gourds*, grown by him in the garden of the Hon. Thomas Brand, at the Hoo, in Hertfordshire; the seed had been obtained from the Ionian Islands. They were perfect specimens of the fruit of the Cucurbita lagenaria, which does not often attain such perfection in the climate of England. They were well formed, and in shape resembled an oval bottle, with an extended neck and flattened base: the length of the whole was near two feet, that of the neck being one foot, and the circumference of the body of the gourd was a little more than two feet. When dried, the coat became perfectly hard, of a light-brown colour; and the internal matter being cleared out with care from the end of the neck, the shell is capable of holding any liquid. The inside matter was completely extracted by frequent application of water only. This species of gourd may be grown on a bed of dung, in the open air, without glass; but it is advisable to tie up the branches to stakes, and to support them on cross pieces affixed to the stakes. When thus trained, the fruit grows suspended, and consequently assumes a regular and uniform shape. The plant may also be trained to a south wall, against which it will grow vigorously. The beautiful large white flowers which are produced abundantly on the plants so managed, have a very handsome effect in the garden. It is necessary to stop the shoots, where they have attained a certain length, to force them into bearing.

At the same Meeting. A *Queen Pine*, grown by Peter Marsland, Esq. of Woodbank, near Stockport, was exhibited. It weighed three pounds fourteen ounces, mea-

sured seventeen inches in circumference, and was peculiarly well flavoured. The singularity of this Pine was its being the produce of a sucker which had been removed from the parent root only six months previous to the time the fruit was cut. The plant, on which the sucker grew, had produced a fruit which was cut in October, 1817; the old stem, with the sucker attached, was allowed to remain in the Pine-pit till May, 1818; at that time the sucker was broken off, potted, and plunged into a fresh pit; it soon after shewed fruit, which, in the course of four months, attained to the weight and size above stated. Mr. MARSLAND is in the practice of producing Pines in this way with equal success and expedition. His houses are all heated by steam.

At the same Meeting. Some heads of a *Dwarf Indian Corn*, grown in the garden of the Society, were exhibited. They were produced from seed sent to the Society from Paris, by M. VILMORIN, under the name of *Maïs à poulet.* The plants do not exceed eighteen inches in height, are very hardy, not being injured by the spring frosts; the seeds vegetate perfectly well in the open ground, and do not require the aid of artificial heat to raise them. They should be sown in drills, about two feet apart, and the plants when thinned, should stand at six inches in the row from each other; their heads, which will be perfectly ripe before the end of September, are about three inches long, one only being usually produced on each plant: when a second blossom appears, it is generally abortive. The grains are of a bright-yellow colour, round and small; and the flour they contain appears to be peculiarly white and fine. The varieties of the common Maize (the Zea Mays of LINNEUS) are numerous

and it is possible that this may be a very dwarf and hardy sort, referable to this species ; but it has been suggested that the *Maïs à poulet* may be the plant described by MOLINA, in his Natural History of Chili, as growing in that country, with a smaller grain, which furnishes a meal whiter, more light, and in greater quantity, than the common kinds of Maize. MOLINA considers his plant to be a distinct species, calling it *Zea Caragua*, and distinguishes it as having its leaves serrated or denticulated ; the margin of the leaves of the *Maïs à poulet* is not smooth, but edged with minute hairs, which give a slight appearance of serrature. Should it be thought desirable to make the experiment, the perfect hardiness of this plant fits it well for field culture.

NOVEMBER 17, 1818. At this, and the Meetings on the 5th of January, and 2nd of February following, Mr. BRADDICK exhibited specimens of a *Grape*, raised from the seed of the Hampton Court, or Red Hamburgh Vine. This was the first season of the Vine's bearing. It closely resembles its parent in the shape of the bunch and berries, as well as in the colour, and is also like it in flavour, which is however higher, and more spirited. The specimens which were exhibited in February, were cut when the Vines were pruned in December, the berries being then perfectly ripe, and had been hanging up in a kitchen, with bunches from many other varieties, none of which kept in the same state of perfection as those of this seedling. It has received the name of *Braddick's Hamburgh*, and promises to be a very useful and valuable grape.

DECEMBER 1, 1818. Some *Roseberry Strawberries*, in

pots, growing strongly, and bearing perfectly ripe fruit, not only very fine in appearance, but excellent in flavour, were exhibited by Mr. LEE, of Hammersmith. The plants having been forced in pots in the spring, and subsequently turned out into an open border, were re-potted in October, and placed in a vinery, where they began, and continued for a long time to bear fruit abundantly. The Roseberry appears to be particularly well adapted to produce autumnal crops, under skilful treatment, and thus to extend the supply of Strawberries almost through the whole year.

At the same Meeting. A letter was received from JOHN WILLIAMS, Esq. of Pitmaston, near Worcester, describing a *Double-bearing Red Raspberry* (which he had raised from seed), much superior to the old kind, which produces fruit of indifferent quality. The second crop of this new variety commences in August, and is well flavoured till the middle of October; but even after that time, it continues to bear, as appeared by the plant received by the Society, at the same time with the letter, having a branch with fruit upon it. The autumnal fruit is not only produced at the ends of the annual shoots, but also on suckers, which rise from the root about Midsummer, and bear abundantly. Mr. WILLIAMS believes that this Raspberry, when known, will become a great favourite, not only in private gardens, but with the market gardeners.

DECEMBER 15, 1818. Mr. JOHN WILMOT, of Isleworth, in a communication read this day, states the great advantages he had experienced in the management of his crops, as a market gardener, from the use of *fresh dung*, in preference

to dung in the decayed state in which it is usually applied to vegetables. The greater extent of ground for which a given quantity of manure in a fresh state will suffice, with equal effect, is one obvious cause for the preference of it. Mr. WILMOT also finds that the succeeding crop derives such essential benefits from the dung, which has been so applied, that it is not necessary to have additional manure for it; but this is not the case when old rotten dung only has been previously used.

At the same Meeting. A description (accompanied with plans) drawn up by Mr. GEORGE LODDIGES, of the *Steaming apparatus*, lately erected by Messrs LODDIGES and Sons, in their extensive Nursery-grounds at Hackney, was read. An account of the machinery, with similar details, having been subsequently given to the public by Messrs. LODDIGES, in the third Volume of the *Botanical Cabinet*, a repetition of the publication in the Transactions of the Society is unnecessary; but the subject is here introduced, for the purpose of recording the opinion of the Society on the laudable spirit with which a work of such magnitude has been undertaken, and so perfectly executed. The extent of houses heated by steam in Messrs. LODDIGES' gardens, from one furnace, is eleven hundred feet. The extraordinary health, and the flourishing condition of the plants cultivated in those houses, are proofs of the superior advantages of this mode of heating: and as it is applicable to houses of any magnitude, it encourages the hope that we shall, ere long, possess in our gardens the large and magnificent natives of the tropical countries in full vigour. It is understood that Messrs. LODDIGES have in contemplation the erection of a house of

larger dimensions, than any that has yet been formed, for the growth of Palms; the steam from the boiler already erected by them, will supply this new house, in addition to the large space already heated by it.

JANUARY 5th, 1819. Several roots of *Celeriac*, which had been grown in the garden of the Society, were exhibited. They were nearly the size of those usually imported from Holland and Germany. The experiment had been tried of cultivating these plants in the manner stated in a paper published in the Transactions of the Society,* and it had answered: they were previously treated, as directed in that Paper, and afterwards planted in an open border made as rich with dung as possible, and were daily supplied, during the whole of the summer, with abundance of water, which seems essential to their success.

FEBRUARY 2d, 1819. CHARLES NICHOLAS PALLMER, Esq. communicated, in a letter to the Secretary, a *plan*, suggested to him by the President, *for bringing seeds from distant countries.* The excellent condition in which several kinds of seeds, (a part of which were presented by Mr. PALLMER to the Society,) had arrived from Jamaica, fully proved the efficacy of the method. The seeds, as soon as taken from the pulp, were packed in mould of the strongest consistence, which had frequently been wetted, so as to be saturated with moisture. In this state they were enclosed in boxes, and transferred to the hold of the ship which

* Vol. III. p. 171

brought them to England. When sown, they vegetated freely, and very few failed.

April 6th, 1819. This day were received specimens of the *Casuarina*, described in a former Volume of the Transactions of the Society,* as growing in the gardens of His Royal Highness the Grand Duke of Saxe Weimar, at Belvedere; they had been transmitted to the Society, from Weimar, by Dr. Noehden, conformably to the orders of His Royal Highness. The plant in question seems to be the male of a dioecious species, which was found growing on the south coast of New Holland, by Mr. Brown, and by him called *Casuarina acida*, on account of the flavour of its ultimate ramuli, which flavour even the dried specimens in some degree preserve, as does also the specimen received from Weimar. Labillardiere, in his *Plants of New Holland*,† has described and figured as Casuarina quadrivalvis, a native of Van Diemen's Land, which has a strong resemblance to this plant, and is perhaps the same; but should it prove so, the specific name of quadrivalvis, derived from the number of the valves of the calyx of the male flower, is objectionable, inasmuch as all the species of Casuarina that have yet been examined have, according to Mr. Brown's observations, that structure. The Casuarina equisetifolia is a more tender plant than that under consideration; it is a native of the warmer parts of New Holland, as well as of the South Sea Islands, and is readily distinguished from the C. acida by its pendulous pubescent branches, and by being monoecious.

* Vol. III. page 332. † Vol. II. page 67, and Plate 218.

Some few other species of Casuarina have been noticed by botanical writers, which are also natives of New Holland; but, besides these, there are several new and undescribed species found in the same country, of which Mr. Brown has specimens in his Herbarium. These, together with the others already known, will be hereafter described by him, in the second volume of his *Prodromus of the Plants of New Holland.*

At the same Meeting. Sir Abraham Hume communicated to the Society an account of a plant of the *Magnolia conspicua* (the *Youlan* of the Chinese,) at this time in full blossom in his garden at Wormleybury, in Hertfordshire. It is trained to a south wall, fourteen feet high; it reaches to the top of the wall, and spreads laterally fifteen feet and a half. The number of flowers upon it, nearly all of which were fully expanded when counted, were nine hundred and fifty-six, and they were throughout of considerable size. The tree was planted, where it now grows, in the year 1801, in a mixture of loam and bog earth, the subsoil being moist, with springs. It had not been covered in the winter preceding, which, however, was remarkably mild: the plant has, at all times, borne its exposure abroad without injury, though it had not blossomed so abundantly and vigorously before.

VII. *On the Cultivation of the* Granadilla, *or* Passiflora quadrangularis. *In a Letter to the Secretary. By Mr.* Robert Chapman, *Gardener to the Earl of* Harewood, *F. H. S.*

Read September 1, 1818.

Sir,

Agreeably to your request, I now send you an account of my management of the *Passiflora quadrangularis*, which has uniformly borne fruit since I came to Harewood House, in 1782, the plants having been in a bearing state many years before that time.

The Passiflora quadrangularis is readily propagated by seeds or cuttings. It requires to be grown in rich loam, in which I usually plant it, in a corner of the pit of a Pine stove, the heat of which is essential to its well doing. The space in which it is planted is separated from the bark by a partition of stones, which are perforated, to allow the roots to enter the bark.

In December, I cut in the shoots to either three or four eyes of the stem or old wood; this, in my plant, is about six feet long, but it may always be left equal to the height between the pit and the rafter; I then let it remain untouched till the beginning of March following, by which time, it will have made shoots three or four feet long. In March I cut off the roots all round within six inches of the stem, leaving only a ball of roots attached to the plant, of about one foot diameter; the ball is immediately replaced in its position, care being taken not to shake it, and the space

round it is filled with fresh earth, and then I give it plenty of water, of which it requires an abundant supply during the summer months. Except the fresh earth which is given to it at the time its roots are pruned, it requires no other dressing.

The shoots of each plant, being in number from seven to ten, are trained under the rafters of the house, in the manner of the grape vine, and will extend twenty feet in the course of the season, being carried horizontally on wires from the tops of the rafters along the upper part of the house.

The plant begins to flower in May, but being excluded from the action of the air, and the communication usually effected by insects, the farina from the male does not readily come in contact with the female part of the flower, and therefore some artificial assistance is necessary to fecundate the germen. This is given by a camel's-hair pencil being lightly drawn over the anthers, when they are in a proper state, and applied to the style; the operation should be performed about nine or ten o'clock in the forenoon, and if the plant be in good health, the fruit will then set kindly, especially if the fecundation takes place when the weather is clear and warm.

The fruit that sets in May usually ripens in the end of August, or early in September. As the plant flowers at intervals of three weeks, I never let more than five or six fruit of one setting remain, but keep up a succession, so as to make my crop last till the end of November.

There are here two fruiting plants, which are now very strong; they are about six inches in circumference, at the bottom of the stem, and each plant produces twenty fruits, on an average, in a season.

I have treated the Passiflora laurifolia nearly in the same manner as the P. quadrangularis, and have succeeded in making it bear, though it does not produce so kindly as the other. Its fruit, with me, is nearly the size of that of the purple-fruited Passion-flower (now called Passiflora edulis,*) which you have figured and described in the *Transactions*† *of the Horticultural Society.*

I remain, Sir,

your most obedient humble Servant,

ROBERT CHAPMAN.

Harewood House,
August 29th, 1818.

* See Bot. Mag. Pl. 1989.

† Vol. III. p. 99.

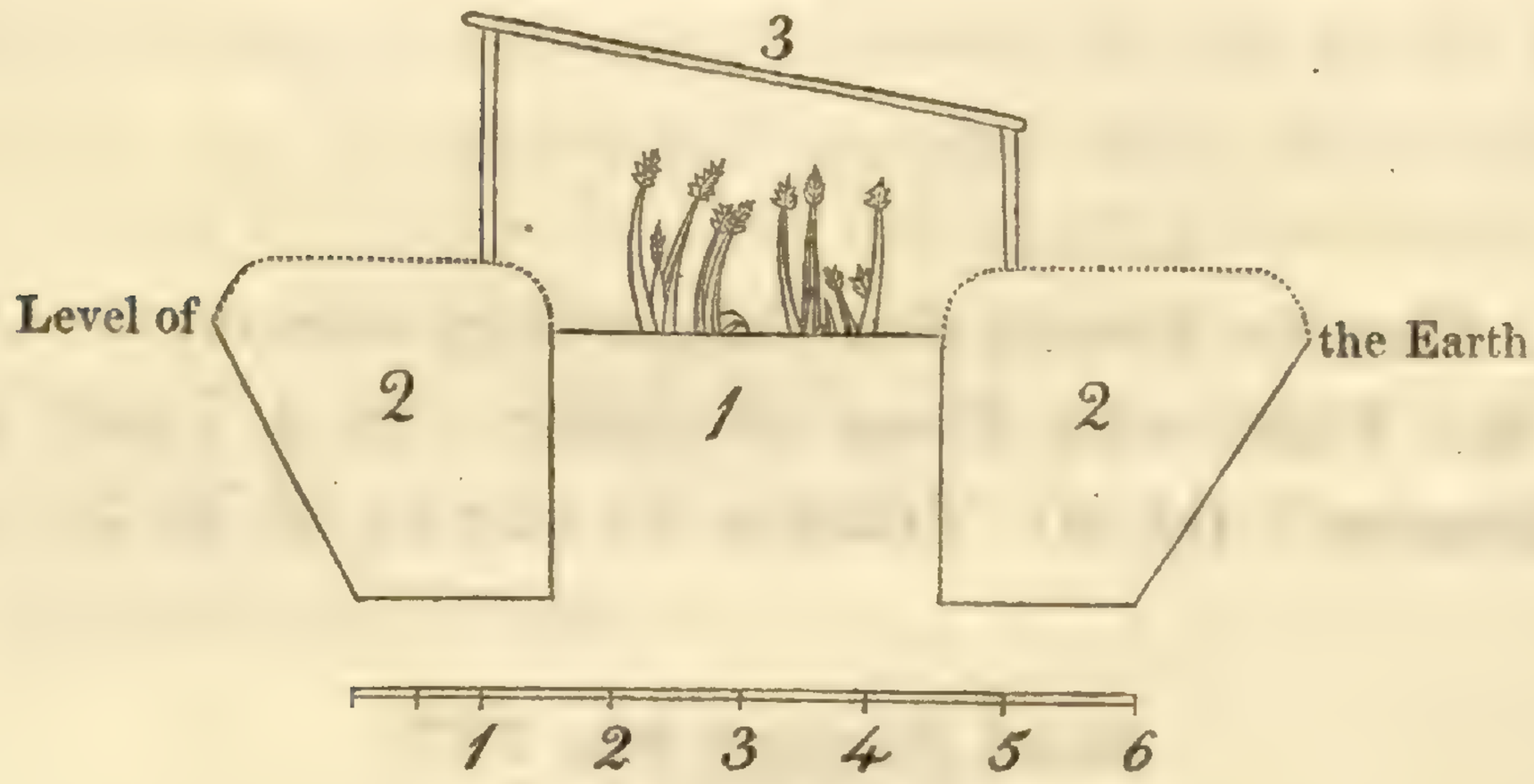
VIII. *Plan for Forcing* Sea Kale, *without covering the Crowns of the Plants with Dung or Litter. In a Letter to the Secretary. By Mr.* Thomas Baldwin, *F. H. S.*

Read January 4th, 1820.

Sir,

I have sent you herewith, a section of my bed for *forcing Sea Kale;* the advantages of the plan here described are, that no dirt from the litter gets into the growing plants, and that the shoots are perfectly free from all mustiness, or bad flavour, contracted from the dung which covers them in the ordinary method of forcing; and though these inconveniences are, to a certain degree, prevented by the use of pots made for the purpose, I consider my plan as preferable, where plenty of garden lights are to be obtained. At all events, it is perfectly successful, and it will, perhaps, be thought deserving of being made generally known.

On each side of a three-foot bed, in which the Sea Kale has been planted, trenches are formed two feet deep, and eighteeen inches wide at bottom; the side of the frame next the bed is perpendicular, the other side is sloped so as to make the top of the trench at the level of the soil, two feet and a half wide; this trench is filled with linings of hot dung, on the inner edges of which, garden lights are placed, and the glass kept covered with mats until the Kale is fit to cut.



Scale of half an inch to a foot.

Reference to the Figures.

1. The bed in which the Kale grows.
2. The trenches filled with dung.
3. The garden frame over the bed, placed upon the dung.

The same plan is applicable to the forcing of Asparagus; the heat of the linings, which may be renewed if necessary, penetrates into the bed, and forces the plants to grow rapidly.

I am, Sir,

Your humble servant,

THOMAS BALDWIN.

Ragley, November 13, 1819.

Note by the Secretary.

This method of forcing is applicable to the early production of Rhubarb, or any other perennial vegetable which may be required in a garden; but it does not seem necessary to place the glass lights on the frames when the plants are to be blanched, a covering of wood, or mats of sufficient thickness, need only be used in such cases.

IX. *An Account of some of the best Varieties of* Apples *peculiar to, or cultivated in, the County of Norfolk. In a Letter to the Secretary.* By Mr. George Lindley, *Corresponding Member of the Society..*

Read March 7, 1820.

Dear Sir,

I have sent you a box containing fifteen varieties of *Apples*, the greater part of which may be strictly called *Norfolk Apples*, they having either originated in this county, or been more generally cultivated here than elsewhere. As many of them are little known, and are highly deserving notice, I have thought descriptions of them might not be unacceptable.

Believe me,

Yours very faithfully,

George Lindley.

Catton, near Norwich,
13*th November*, 1819.

1. *Colonel Harbord's Pippin.* Above the middle size, slightly inclining to conical, angular on the sides; eye large, in rather a shallow cavity, surrounded by bold plaits or wrinkles; skin of a pale yellowish-green, partially russetted on one side. Flesh white, mixed with green, soft, very juicy, with a pleasant brisk astringency. A very excellent kitchen apple. It took its name from the present Lord Suffield,

previously to his becoming a Peer. The trees, which are of the largest size, are old, all growing to the north of Norwich, and chiefly on the Suffield estates; I never observed them elsewhere.

2. *Caroline.* Above the middle size, globular; eye small, in a rather confined hollow, round which are prominent plaits; stalk very short, surrounded by a little russet; the skin is of a fine rich yellow, broadly streaked with red; hence it has been called the Red Streak, but it bears no resemblance to the old Apple well known by that name. Its high flavour and brisk juice render it one of the best kitchen apples. The tree from which this fruit was taken is old, and stands in Lord SUFFIELD's garden, at Bleckling. It grows late in the autumn, and is now (November 1819) quite green, when other Apple trees have nearly lost all their foliage. Lady SUFFIELD's name is *Caroline*, whence this name has originated.

3. *Winter Colman.* This is generally called the Norfolk Colman or Coalman, I imagine from its dark colour. Its good keeping quality has generally recommended it, and it is now universally cultivated. It is a very vigorous grower, its shoots are erect, and it makes a large tree; bears bleak situations, and is not subject to canker.

4. *Winter Broaden*, or *Broadend.* This is a Norfolk Apple wholly different from that known as the Kentish Broadend. It is of the middle size; globular, flattened at both ends; the eye is placed in a small cavity; the stalk very short, and deeply inserted; the skin is of a pale green hue, with a tinge of faint brownish red on the side exposed to the sun.

The flesh is white, mixed with green, soft, with a sweet, pleasant juice. It is one of the most common Apples in old cottage gardens, and is brought in great plenty to the Norwich market from Michaelmas to Christmas, and with care will keep much later.

5. *Harvey*, or *Dr. Harvey's Apple*. Middle size; very perfect oval, slightly angular on the sides; skin pale yellow, with a large proportion of light-coloured russet. The flesh is white, crisp, and juicy, very highly sugared, with a pleasant acidity. It is one of the most common winter Apples in the Norwich market; when baked it becomes a most excellent sweet-meat, far exceeding any other that I have met with. The tree is a very hardy one, and grows to a good size.

6. *London Pippin*. This Apple, though now very common, is of Norfolk origin. It is also known as the Five-crown Pippin, from the five distinct angles on its sides, terminating round the eye. It is common in the Norwich market throughout the winter. The fruit is produced very much in clusters, the shoots are short, and the tree, which is of the middle size, forms a very close and compact head.

7. *Baxter's Pearmain*. A handsome Pearmain-shaped Apple, with crisp, juicy, and high flavoured flesh; not inferior to any of the Pearmains. It is a real Norfolk Apple, but not so plentiful in the market as the four preceding sorts, for many of the old trees are in a state of decay, but I have not observed this to be the case with those more recently planted. The shoots are long, not erect, and the tree makes a large irregular head.

8. *Belle Bonne* This is a middle sized, and almost conical fruit; broad at the base, full in the middle, and narrow at the crown; eye small, flat, and closed by the segments of the calyx; stalk short, slender; skin pale, greenish yellow, brightened on the sunny side by a few reddish streaks, which become russetty at the base, and surround the stalk. Flesh firm, juicy, and well flavoured. A valuable kitchen fruit from November till April. I know but one tree of this kind, which is growing in a garden in this village (Catton), and that appears to be about forty years old. Its name was given it last year, from its excellence.

9. *Hubbard's Pearmain.* Small, of the Pearmain form, or rather more of the shape of the Pommeroy. Another real Norfolk Apple, which I never observed out of the county. The fruit in some seasons are as bright as gold, and as smooth as the finest Pippin; at other times they are perfect Russets, and sometimes both of these appearances are produced on the trees at the same time. The young shoots are rather slender and wiry; the bark is of a dull nutmeg colour, by which it is distinguished. The tree is very hardy, and grows to the middle size.

10. *Winter Majetin.* This Apple resembles the London Pippin in form, having prominent ribs round the crown, but it is a little more oval; the skin is a dull green, with a tinge of brownish red on the exposed side. The flesh is greenish white, and resembles the French Crab in texture and flavour. This is another real Norfolk Apple, of the most hardy kind. There is something very peculiar in the nature of the tree: the white mealy insect has many years infested the bottom of the trunk of an old tree of the kind

in Norwich, *below* where it had been grafted, but it never has been observed upon any other part, although all the trees in the same garden have been quite pestered with it.

11. *Fouldon Pearmain.* This is a good sized Apple, of an oblong shape, somewhat resembling the old Green Pearmain; skin of a pale yellow, with a little blush on the sunny side, especially towards the base. Flesh greenish white, very firm; juice plentiful, brisk, and of a very high flavour. A most excellent fruit, both for table and kitchen use, from November till March. It is a seedling, and has received the name of Pearmain, but it resembles more the Nonpareil both in form and flavour. The specimen now sent was gathered from the original tree, growing in the garden of Mrs. Horrex of Fouldon, in this county. The tree is hardy, and a very good bearer.

12. *Horsham Russet.* A seedling, about thirty years old, raised from a Nonpareil, which it resembles in form, but the skin is clearer where not covered with russet. The flesh is white, with a slight mixture of green, like the Nonpareil, to which I think it is nearly equal in flavour when in full perfection. It was raised by Mrs. Goose, of *Horsham Saint Faith's*, near Norwich. Its young wood, and form of the full grown head, very much resemble those of its parent, the Nonpareil. The tree is very hardy, perfectly free from canker, and a great bearer.

13. *White Stone Pippin.* Middle sized, conical, and very irregular in its form; eye deeply inserted in a contracted cavity, which is surrounded by large ribs or plaits; stalk short, deeply inserted; skin bright green, with a tinge of

yellowish red on the exposed side, and a little russet round the stalk. Flesh greenish, crisp, juicy, and sweet. This is so excellent a keeper, that it is always to be found in the Norwich market in the August of the following year. It is another real Norfolk Apple, of great merit. It is known every where in the county by the name of *White Pippin*; but it is a very different Apple from the Yorkshire *White Pippin*, which is a flattish fruit. This, from its density, I have always considered as the true *Stone Pippin*. It never has much colour in the most exposed samples; hence it differs from the one mentioned by Mr. Forsyth. It is very hardy, makes a large tree, and is a great bearer.

14. *Winter Queening*. This is about the middle size; globular, with prominent ribs on the side; the eye is large, in a shallow cavity; stalk short, not deeply inserted; the skin is pale green, with deep red mixed with russet on the exposed side. The flesh is white with a mixture of green, crisp, juice, having a slight aromatic perfume. It is sometimes also called *Dutch Queening*. It is a valuable kitchen fruit, and an excellent market-gardener's Apple, packing well for long carriage. Is is known principally in the south and south-east parts of this county, and the adjoining parts of Suffolk. The young shoots are erect, of a very dark brown colour, and glossy. It grows very fast, makes a large tree, is very hardy, and a great bearer.

15. *Dutch Mignonne*. A handsome globular Apple; eye small, rather prominent: stalk short, deeply inserted; skin unusually thin, pale green, with bright scarlet on the side next the sun. Flesh yellow, crisp, with a brisk astringent

juice. This is a Dutch Apple. The trees were brought from Holland into this village some years ago, by a gentleman lately deceased ; but its Dutch name is lost here. Its shoots are strong, erect, and it makes one of the largest sized trees. It is hardy, and a most excellent bearer.

X. *Upon the Culture of the* Pine Apple, *without Bark, or other Hot-bed.* *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read March 7th, 1820.

In a communication which I had the honour to send to the Horticultural Society in the last autumn, upon the effects of very high temperature, when accompanied by very bright sunshine, upon some species of plants, I mentioned that I had made a few, apparently very successful, experiments upon the culture of the Pine Apple: but I declined, at that period, to describe the means I had used; because several experienced gardeners in the vicinity were of opinion that my plants could not be made to survive, in health at least, the winter. The same gardeners have since frequently visited my hot-house, and they have unanimously pronounced my plants more healthy and vigorous than any they had previously seen: and they are all, I have good reason to believe, zealous converts to my mode of culture.

I had no intention whatever to attempt to raise Pine Apples till the autumn of 1818, when I received from one of my friends in this vicinity, Mr. Ricketts, of Ashford Hall, some seeds of the Mango, and soon afterwards some more seeds of that, and other tropical fruit trees, from one of our Members, Mr. Pallmer. I then resolved to erect a hot-house, chiefly for the purpose of attempting to cultivate the

Mango; but I had long been much dissatisfied with the manner in which the Pine Apple plant is usually treated, and very much disposed to believe the bark bed, as Mr. KENT has stated it in our Transactions,* "worse than useless," subsequently to the emission of roots by the crowns or suckers. I therefore resolved to make a few experiments upon the culture of that plant; but as I had not at that period, the beginning of October, any hot-house, I deferred obtaining plants till the following spring. My hot-house was not completed till the second week in June, at which period I began my experiment upon nine plants, which had been but very ill preserved through the preceding winter by the gardener of one of my friends, with very inadequate means, and in a very inhospitable climate. These, at this period, were not larger plants than some which I have subsequently raised from small crowns, (three having been afforded by one fruit) planted in the middle of August, were in the end of December last; but they are now beginning to blossom, and in the opinion of every gardener who has seen them, promise fruit of great size and perfection. They are all of the variety known by the name of Ripley's Queen Pine.

Upon the introduction of my plants into the hot-house, the mode of management, which it is the object of the present communication to describe, commenced. They were put into pots of somewhat more than a foot in diameter, in a compost made of thin green turf, recently taken from a river side, chopped very small, and pressed closely, whilst wet, into the pots; a circular piece of the same material, of about an inch in thickness, having been inverted, unbroken, to

* Vol. III. page 288.

occupy the bottom of each pot. This substance, so applied, I have always found to afford the most efficient means for draining off superfluous water, and subsequently of facilitating the removal of a plant from one pot to another, without loss of roots. The surface of the reduced turf was covered with a layer of vegetable mould obtained from decayed leaves, and of sandy loam, to prevent the growth of the grass roots. The pots were then placed to stand upon brick piers, near the glass; and the piers being formed of loose bricks (without mortar), were capable of being reduced as the height of the plants increased. The temperature of the house was generally raised in hot and bright days, chiefly by confined solar heat, from 95° to 105°, and sometimes to 110°, no air being ever given till the temperature of the house exceeded 95°; and the escape of heated air was then, only in a slight degree, permitted. In the night the temperature of the house generally sunk to 70°, or somewhat lower. At this period, and through the months of July and August, a sufficient quantity of pigeon's dung was steeped in the water, which was given to the Pine plants, to raise its colour nearly to that of porter, and with this they were usually supplied twice a day in very hot weather; the mould in the pots being kept constantly very damp, or what gardeners would generally call wet. In the evenings, after very hot days, the plants were often sprinkled with clear water, of the temperature of the external air; but this was never repeated till all the remains of the last sprinkling had disappeared from the axillæ of the leaves.

It is, I believe, almost a general custom with gardeners, to give their Pine plants larger pots in autumn, and this mode

of practice is approved by Mr. BALDWIN.* I nevertheless cannot avoid thinking it wrong; for the plants, at this period, and subsequently, owing to want of light, can generate a small quantity only of new sap; and consequently, the matter which composes the new roots, that the plant will be excited to emit into the fresh mould, must be drawn chiefly from the same reservoir, which is to supply the blossom and fruit: and I have found that transplanting fruit trees, in autumn, into larger pots, has rendered their next year's produce of fruit smaller in size, and later in maturity. I therefore would not remove my Pine plants into larger pots, although those in which they grow are considerably too small.

As the length of the days diminished, and the plants received less light, their ability to digest food diminished. Less food was in consequence dissolved in the water, which was also given with a more sparing hand; and as winter approached water only was given, and in small quantities.

During the months of November and December, the temperature of the house was generally little above 50°, and sometimes as low as 48°.† Most gardeners would, I believe, have been alarmed for the safety of their plants at this temperature; but the Pine is a much hardier plant than it is usually supposed to be; and I exposed one young plant in December to a temperature of 32° degrees, by which it did not appear to sustain any injury. I have also been subsequently informed by one of my friends, Sir HARFORD JONES,

* Baldwin's Practical Directions for the Culture of the Ananas, page 16.

† Subsequently to the time this Paper was sent to the Society, I have been informed, that the thermometer was once, in the last winter, so low as 40 degrees.

who has had most ample opportunities of observing, that he has frequently seen, in the east, the Pine Apple growing in the open air, where the surface of the ground, early in the mornings, shewed unequivocal marks of a slight degree of frost.

My plants remained nearly torpid, and without growth, during the latter part of November, and in the whole of December; but they began to grow early in January, although the temperature of the house rarely reached 60°; and about the 20th of that month, the blossom, or rather the future fruit, of the earliest plant, became visible; and subsequently to that period their growth has appeared very extraordinary to gardeners who had never seen Pine plants growing, except in a bark-bed, or other hot-bed. I believe this rapidity of growth, in rather low temperature, may be traced to the more excitable state of their roots, owing to their having passed the winter in a very low temperature comparatively with that of a bark-bed. The plants are now supplied with water in moderate quantities, and holding in solution a less quantity of food than was given them in summer.

In planting suckers, I have, in several instances, left the stems and roots of the old plant remaining attached to them; and these have made a much more rapid progress than others. One strong sucker was thus planted in a large pot upon the 20th of July; and that is beginning to shew fruit. Its stem is thick enough to produce a very large fruit; but its leaves are short, though broad and numerous; and the gardeners, who have seen it, all appear wholly at a loss to conjecture what will be the value of its produce. In other cases, in which I retained the old stems and roots, I selected small

and late suckers, and these have afforded me the most perfect plants I have ever seen; and they do not exhibit any symptoms of disposition to fruit prematurely. I am, however, still ignorant whether any advantage will be ultimately obtained by this mode of treating the Queen Pine: but I believe it will be found applicable with much advantage in the culture of those varieties of the Pine, which do not usually bear fruit till the plants are three or four years old.

I shall now offer a few remarks upon the facility of managing Pines in the manner recommended, and upon the necessary amount of the expense. My gardener is an extremely simple labourer, he does not know a letter or a figure; and he never saw a Pine plant growing, till he saw those of which he has the care. If I were absent, he would not know at what period of maturity to cut the fruit; but in every other respect he knows how to manage the plants, as well as I do; and I could teach any other moderately intelligent and attentive labourer, in one month, to manage them just as well as he can: in short, I do not think the skill necessary to raise a Pine Apple, according to the mode of culture I recommend, is as great as that requisite to raise a forced crop of Potatoes. The expense of fuel for my hot-house, which is forty feet long, by twelve wide, is rather less than seven-pence a day here, where I am twelve miles distant from coal-pits: and if I possessed the advantages of a curved iron roof, such as those erected by Mr. LOUDON, at Bayswater, which would prevent the too rapid escape of heated air in cold weather, I entertain no doubt, that the expense of heating a house forty-five feet long and ten wide, and capable of holding eighty fruiting Pine plants, exclusive of Grapes or other fruits upon

the back wall, would not exceed four-pence a day. A roof, of properly curved iron bars, appears to me also to present many other advantages: it may be erected at much less cost, it is much more durable, it requires much less expense to paint it, and it admits greatly more light.

I have not yet been troubled with insects upon my Pine plants, and have not, of course, tried any of the published receipts for destroying them. Mr. Baldwin recommends the steam of hot fermenting horse-dung:* I conclude the destructive agent, in this case, is ammoniacal gas; which Sir Humphry Davy informed me he had found to be instantly fatal to every species of insect; and if so, this might be obtained at a small expense, by pouring a solution of crude muriate of ammonia upon quick lime; the stable, or cow-house, would afford an equally efficient, though less delicate fluid. The ammoniacal gas might, I conceive, be impelled, by means of a pair of bellows, amongst the leaves of the infected plants, in sufficient quantity to destroy animal, without injuring vegetable life: and it is a very interesting question to the gardener, whether his hardy enemy, the Red Spider, will bear it with impunity.

* Baldwin's Practical Directions, &c. page 30.

XI. *An Account of the Produce of the* Peach Trees *in the Garden at Wortley Hall*, since the Year 1808 inclusive. *In a Letter to the Secretary.* *By Mr.* Charles Harrison, *F. H. S. Gardener to* James Stuart Wortley, *Esq. M. P. F. H. S.*

Read March 7th, 1820.

Sir,

I have much pleasure in complying with your request, that I would send you a statement of the number of Peaches and Nectarines produced in the garden at this place, for the last twelve years, to illustrate the Papers already published in the Society's Transactions relative to them.*

The account of the produce of the first six years is founded on calculations made as correctly as I am able, the crop not having been counted as it was gathered in those years; the amount during the latter six years is more exact, because the whole was entered in a book, which was signed by the person who received the fruit. You will observe, that in the last two years the number of trees has been reduced, the part of the wall having been appropriated to other purposes. The numbers of the fruit stated, do not include any that were lost by waste or decay, the account being exclusive of all such, which in some seasons have been considerable. Since the crop of this year has been gathered, the trees have, by Mr. Wortley's desire, been reduced to twenty.

* Vol. II. page 13. Vol. III. page 37.

In 1808	32 Trees produced	7450	Peaches and Nectarines.
1809	- - -	8314	
1810	- - -	10680	
1811	- - -	5850	
1812	- - -	10754	
1813	- - -	9306	
1814	- - -	8082	
1815	- - -	8928	
1816	- - -	15184	
1817	- - -	8026	
1818	28 Trees produced	3116	
1819	- - -	10029	

Most of the trees were planted in 1801; in 1805, when I came into Mr. WORTLEY's service, they then covered a great part of the walls, but there was not one fruitful shoot upon them, nor had they produced any crops up to that time. Immediately after I had the management of the garden I headed down all the trees, and in the following year (1806) obtained tolerably good new heads, the wood of which ripened well. In 1807 they bore a very good crop; but I have no means of estimating that year's produce. The previous failure of the trees did not arise from their being too young; had they been properly treated, my former as well as subsequent experience enables me to state, that they would have borne abundantly. It was the opinion of many gardeners in the neighbourhood, that the trees would be so injured by the large crop (of 1807) which was allowed to remain on them, so soon after they were headed down, that

they would do little afterwards; but this opinion proved to be erroneous.

The aspect of the chief wall is south-south-east, it is eleven feet and a half high, and the soil is a strong loam mixed with a little marl. Seventeen of the old trees are trained to this wall, and entirely cover it, being planted at the distance of sixteen feet apart. The remaining three trees are upon a separate wall, twelve feet high, similarly situated; these were planted by myself in 1811, and, together, extend over one hundred and one feet of wall in length, intersecting each other; they would have spread farther, had they not been very much shortened.

In 1817 I trenched the borders to the bottom, two feet and a half deep, turning the top soil, which had been well enriched with vegetable manure,* to the bottom, and in the trenching mixed with the new upper surface rotten horse dung and vegetable manure. When the trench was open, and the roots of the trees bare, I pruned them in to within four feet of the bole, (trenching the earth to within two feet of the bole,) and after pruning the roots, I laid them carefully upon the soil, and trenched forwards, as before stated.

The twenty trees now remaining are,

4 Newington Nectarines
2 French Magdalen Peaches
2 Red Magdalen ditto
3 Royal George ditto

* By vegetable manure I mean a mixture of decayed cabbages, bean stalks, and the refuse of the garden, which have been suffered to lie together in a heap for several years till they have become quite decomposed, and in a fit state to use as dressing for the border.

4 Millett's Mignonne Peaches
2 Royal Charlotte ditto
1 Noblesse - ditto
2 Late Admirable ditto.

I was sorry to observe an incorrect statement of the produce of this garden in the Paper published in the Society's Transactions in 1818,* by Dr. NOEHDEN, by which it appears as if seven thousand dozen had been gathered from the trees in 1816. The error must have originated in my not properly expressing myself; what I intended to state was, that the above quantity had been produced by the trees up to the year 1816 inclusive, which is correct, as you will discover by taking the amount of that and the eight preceding years together.

I am, Sir,

Your most obedient servant,

CHARLES HARRISON.

Wortley Hall, December 17, 1819.

Note by Dr. NOEHDEN.

The above letter having been communicated to me, I have to observe, that I am glad that any error, which I have been instrumental in spreading, is thus corrected. It was, as will easily be believed, unintentional on my part. I noted down what I conceived Mr. HARRISON to have stated in conversation; but it is possible I might misapprehend him. It

* Vol. III. p. 38.

will, however, be remembered, that I laid not particular stress on the *numerical statement*, in the Paper alluded to, but directed the attention of the Society principally to the mode of treatment, practised by Mr. Harrison.

G. H. Noehden.

January 19, 1820.

XII. *Observations on the* Glazing *of* Hot-houses, *&c. By* Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read March 7th, 1820.

Soon after the Society had received the Paper on the *Glazing of Hot-houses*, written by James Robert Gowen, Esq. and which has been published in the Transactions,* a communication was received from Mr. John Taylor, of Preston in Lancashire, a Corresponding Member of the Society, in which the method of circular glazing, recommended by Mr. Gowen, was considered less advantageous than another plan which had been adopted with apparently better success by Mr. Taylor.

As a house was constructing in the garden of the Society while Mr. Taylor's Communication was under consideration, it was deemed advisable, by way of experiment, to try both his method and that recommended by Mr. Gowen, and three entire lights were therefore glazed on each plan, for the house. The experience of the two last winters (the house having been completed in November, 1818) has furnished some observations, which, as they apply not only to the comparison of these two plans, but generally to the whole system of glazing the roof lights of houses, may be worthy the attention of the Society.

The old, and still most usual method of glazing, is with panes having the top and bottom cut at right angles with the

* Horticultural Transactions, Vol. III. Page 244.

sides, which may be called *Horizontal Glazing*. The inconveniences of this method, as usually performed, are that it requires a considerable lap, to prevent the wet driving between the panes into the house, and thereby causing a drip on the plants; and when the lap is wide, the water, by the attraction of the two contiguous surfaces, collects in it, and in frosty weather becoming ice, expands, and occasions a great breakage of the panes. This breakage is more extensive when the sashes are laid with a slight inclination, so that Green-houses which have sharp pitched roofs, escape usually with less damage than Hot-houses and Pits, which are generally less inclined. To obviate the injuries from frost, the laps of the horizontal glazing are sometimes filled with putty, which, indeed, is quite necessary in houses where great heat is required, for when the laps are not filled the warm air escapes rapidly through them, and a great waste of heat is the consequence; or, if a strong wind blows against the front of the house, a contrary effect is produced by the external air being forcibly driven into it between the laps. The putty prevents these inconveniences, but as the condensed steam collected on the inner surface of the glass runs down it at all points, it is stopped by the putty, and falls in drops on the plants, a continuance of which is injurious. These are the defects of the horizontal glazing, which is certainly the most economical, as well on account of the simplicity in the first execution, as of the facility with which it can be repaired; it is, however, less objectionable for the reasons above given, when the roof lights are very much inclined, or where a low temperature being required in the house, the laps can be allowed to remain unfilled with putty,

but in such cases strict attention should be paid, to make the panes fit as exactly as possible on each other.

The *Circular Glazing*, so well described by Mr. Gowen, in the Paper above alluded to, has none of the faults of the horizontal glazing; the lap can be almost entirely puttied up, so as to confine the heat within the house, or prevent a strong wind blowing the cold air into it; and the small aperture left in the centre carries off all the condensed steam over the outside of the glass, down the centre of the pane, in the same course as the external water. Mr. Taylor, however, by his account of the comparison between his method and the circular glazing, did not experience that exemption from loss by the effect of frost, which is attributed to the latter. He states, that in the winter preceding the date of his communication, one-fifth of his circular-edged panes were broken, for the most part down the middle of each. The experiment in the garden of the Society has yielded a different result. In the late winter, which perhaps has been the most injurious to glazed houses of any within recollection, not only on account of the intenseness of the cold, but from the alternate, and repeated occurrence of freezing and thawing, (the latter consequently producing wet, which, by getting between the laps, and being there frozen, might have caused the glass to crack), not a single pane of the three ranges of circular glazed lights has been injured. Some cause for the difference between the two experiments cited, must have existed; the shape of the glass, and the mode of laying in the putty, were exactly similar; but the laps in Mr. Taylor's lights were half an inch broad, whilst those in the garden of the Society did not exceed one-eighth of an inch. The pro-

HORIZONTAL GLAZING.

CIRCULAR GLAZING.

RHOMBOIDAL GLAZING.

SHIELD GLAZING.

J.C. Loudon, del.

J.B. Tyler, sc.

bability, therefore, is, that the unnecessary width of the lap, in Mr. Taylor's lights, allowed of the formation of ice in the narrow space unoccupied by the putty in the middle of the lap, and the circumstance of so many panes being broken in the centre seems to corroborate this conjecture.

The cutting of circular glazing from square panes is admirably performed, by means of the trammel described by Mr. Gowen, in his Paper above referred to; though, when glass is so cut, it is attended with considerable loss and expense; but I find that the glass cutters supply circular-edged panes, of equal dimensions to the square ones, at a very small additional charge; they cut these out of the whole sheets of glass, by the assistance of a wooden pattern, having an edge with the required curvature, and thus the concave and convex ends of the panes exactly match each other.

The *Glazing* recommended by Mr. Taylor is with *Rhomboidal* panes. The top and bottom of each pane are cut parallel to each other, in a slanting direction from side to side. For the sake of neatness of appearance, the slopes of the panes, in glazing the lights, are turned * towards each other in the contiguous ranges of panes. The laps are puttied, except about one inch at the lower part of each slope, towards which the condensed steam from the inside runs rapidly, and, with the external water, passes down the outside of the glass, at the edge of the adjoining bar. Mr. Taylor's Conservatory was covered alternately, with lights glazed in this manner, and with the circular glazing; and in the winter in which the injury mentioned was sustained amongst the circular

* See Plate III. Figure 3.

panes, no fractures occurred in the others. The three ranges of lights glazed with the rhomboidal glazing, in the garden of the Society, were not injured by the frost of the past winter; but it will be recollected, that the circular glazing also escaped damage equally; both were fixed with laps of one-eighth of an inch width; Mr. TAYLOR's laps were in both cases half an inch wide, so that it is clear that the rhomboidal glazing was relieved from the water which froze in his circular-edged panes. This, according to Mr. TAYLOR's observations, is caused by the attraction of the bars, which carry off the water as fast as it collects in the laps. If the panes for this mode of glazing were to be formed from the glass originally cut into squares, as it is usually procured, there would be more waste of glass than even in the circular edged panes; but they may be cut out of the entire glass without waste, and this being done by a pattern, they would all match or fit with perfect exactness.

The rhomboidal glazing seems, so far, to be very good; but it is open to one strong objection, common to it and, in some degree, to the horizontal glazing, and which it is the direct intention of the circular glazing to meet and remedy. The constant run of the water along the edge of the bar must tend not only to detach the putty from it, but to conduce to the more rapid decay of the bar itself; and should the putty become in the least disarranged, it is most probable that the water would pass through it, and drip into the house under the bar. It sometimes also happens, with this mode of glazing, when the lap is very narrow, and the wind is high from a southern point accompanied with rain, that wet

drives into the house through the open space at the bottom of the panes.

Another mode of glazing is mentioned by Mr. GOWEN, in his Paper; he calls it *Shield Glazing*. This answers equally as well, but it is not superior to the circular glazing. It is a patent invention, and a very neat specimen of the work is exhibited in a house erected by the Patentee at the Union Nursery in the King's Road, near Chelsea. The panes are cut diagonally in straight lines, towards the centre.* In the neighbourhood of Birmingham several houses have been constructed upon this plan.

These four methods of glazing are represented in the annexed Plate. From the preceding observations, the respective merits and defects of each will be so obvious, that it is not necessary to enter into a comparison of them. Persons constructing houses may judge for themselves in the selection; but it seems to be clearly ascertained, that a wide lap is the cause of the breakage which too often occurs, and by which the expense of glazed houses is so heavily increased.

The putty between the laps is subject to be much and frequently out of order. If, however, Mr. GOWEN's directions for painting the surface of the glass in the rabbets could be extended to the laps, and a narrow line of paint be laid over the parts which embrace the putty, its adhesion would be much more effective: the paint would adhere to the glass, and the putty to the paint.

A substitute for putty was invented, and a patent obtained for it, by Mr. STEWART, late gardener to JOHN JULIUS ANGERSTEIN, Esq. of Blackheath; it is called the *Copper*

* See Plate III, Figure 4.

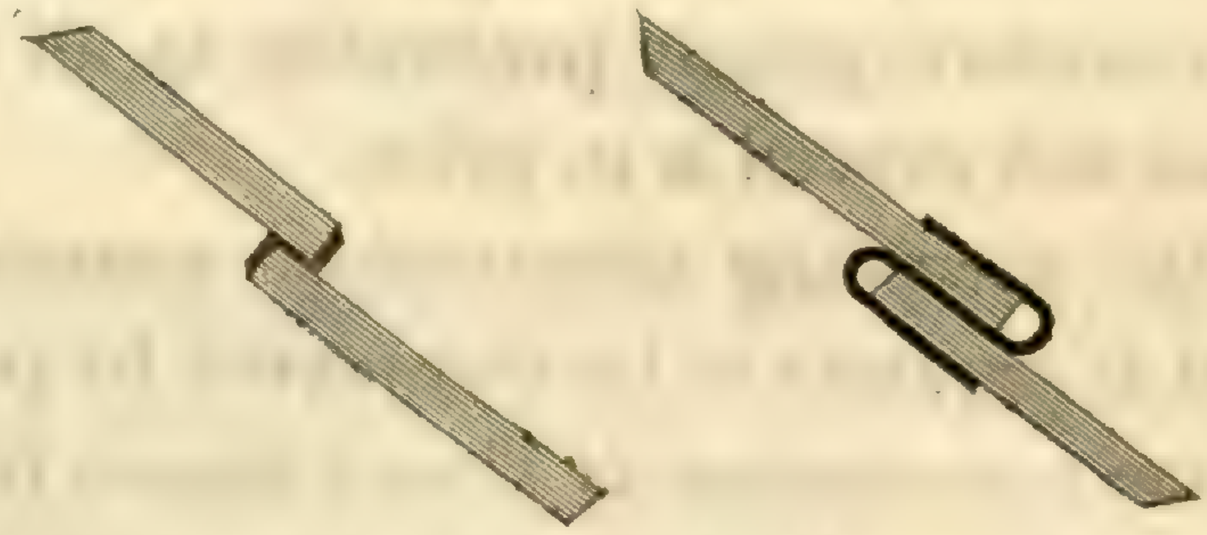
lap, being a thin piece of copper laid between the lap of the panes, and turned downwards over the upper edge of the lower, and upwards over the lower edge of the upper pane. The copper lap is only applicable to glazing done in straight lines, so that it cannot be used with the circular glazing: it completely excludes the external air and wet from the inside of the house, but retains the condensed steam within it, and it effectually preserves the glass from breakage by frost; but where it is used, it is very difficult to replace the panes which are accidentally broken. The piece of copper certainly answers all the purposes of putty, but as it extends wider than the putty would do in the same lap, the obstruction to the light, by such a quantity of opaque matter in each sash, is a great injury to the plants within the house: indeed, this circumstance alone, if no other objection to them existed, would be a reason for endeavouring to get rid of the wide laps of glass, for dirt speedily collects in them when they are not puttied, so far shutting out the light from the inside of the house; and since it is essential to the welfare of the plants to receive as much of the influence of the sun's rays as possible, every diminution of such supply is injurious.

Mr. Loudon has used, with apparent success, instead of copper, sheet lead, rolled as thin as common drawing paper, in the laps. This may be introduced, with or without putty, with panes of any shape, and where it is used, the spaces for the escape of the condensed steam may be left in the Circular, Rhomboidal, or Shield Glazing. It is not found necessary to carry the lead over the upper or under surfaces of the panes, but only to turn it upon the under edge or thickness of the upper pane, and down on the upper edge of the

under pane; so that it allows of the admission of more light than the copper lap, though with similar width of metal.

The annexed sketches represent the difference between the two sorts.

Lead lap. Copper lap.



The lights from whence these representations are taken, are amongst Mr. LOUDON's collection of specimens of glazing, at Bayswater; the lead lap was executed under his direction; the copper lap by the artist employed in the sale of Mr. STEWART's patent.

The lead being very pliable fits readily, is easily cut to any size or shape, and can be repaired with facility; when putty is also applied, it assists in holding it firm, and when it is used alone it retains its hold with sufficient firmness to exclude both wind and rain. It seems to possess all the advantages of the copper lap, without its defects, and does not require the addition of putty, unless the panes are very irregularly fitted to each other.

In order to secure the full advantages of a narrow lap, great attention must be paid to the even fitting of the glass, and next, to the good execution of all parts of the work. If the glazing be well done, and the panes lie close upon each other, the laps, though not exceeding an eighth of an inch in width, may be rendered sufficiently weather tight without copper, lead, or putty, for all purposes, except in those

The lower ends of the poles are advantageously retained in their place, by means of a small iron spring key attached to the coupling by a short chain.

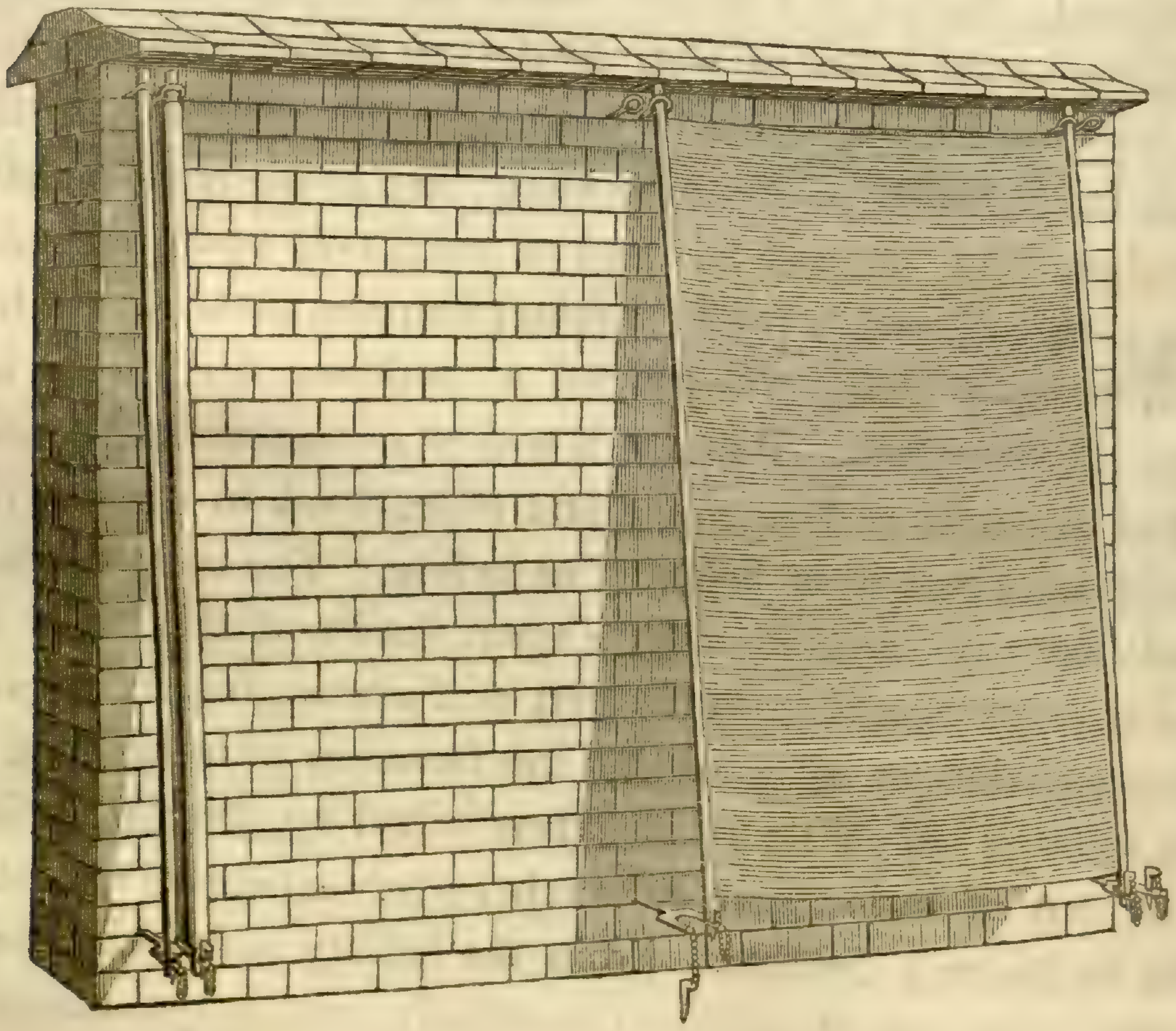
I am, dear Sir,

very faithfully yours,

ROBERT HOLDEN.

Darley Abbey, near Derby,
March 1*st*, 1819.

The annexed sketch of two Skreens, one rolled up, and the other extended, will make the above account sufficiently intelligible.



XIV. *On the Advantages which Trained* Peach *Trees derive from their Roots being allowed to penetrate the Border on the North Side of the Wall. By Mr.* John Robertson, *F. H. S.*

Read March 21st, 1820.

Having observed the benefit which trained trees derive, from their roots having a communication with the ground on both sides of the wall, I beg leave to report an instance of it to the Horticultural Society.

Colonel Gore, of Barrowmount, in the county of Kilkenny, when building his garden walls, about sixteen years ago, formed, in the foundation of those with a southern aspect, arches about three feet wide, by two feet deep, against which he planted Peach trees; he did this with the hope that the trees would be benefitted by their roots thus having access to the exterior soil, and the result shewed that his hopes were well founded; for from that time until this last year, when Colonel Gore changed his residence, and the trees were neglected, they have continued remarkably healthy and vigorous, and have borne abundant crops of well-flavoured fruit; although, within the period above mentioned, there has occurred a succession of bad seasons in Ireland, which, in other gardens, were attended not only with the failure of the fruit, but in many instances with the loss of the trees also: nor can this instance of success be attributed to any local advantage of soil or situation, as the latter is a dead level, and the former a strong loam.

The objection will probably present itself, that the roots of Peach trees, when near a northern aspect, must there imbibe an ungenial nourishment, more likely to produce a cankered and spongy growth of wood, than well ripened fertile shoots. To this the best answer is, that experience has proved the contrary; and a little reflection will shew, that such a result might have been expected.

The temperatures of the earth in shade and sunshine, are not to be judged of by those of the air under similar circumstances, as they bear no relative proportion to each other; the extremes of the latter being more variable, and widely distant, than those of the earth, which, deriving its degree of warmth from the general state of the surrounding atmosphere, possesses it more equally, and with less difference in either situation; so that while the head of the Peach would perish against a north wall, its roots would enjoy nearly as great a degree of warmth, as if in the south borders; and even that difference insensibly lessens, as the distance recedes from the wall, and in a short space becomes imperceptible. The roots of Peach trees when undisturbed, soon reach this point, for in the instance above mentioned, they were found to have run ten or twelve feet from the wall at the north side. In the north border also, which we may suppose wholly appropriated to the use of the trees, their roots will rise to the surface, and occupy it entirely; but in the south border, the ground being constantly cropped and tilled, they are cut and damaged by the spade, and forced down into the under stratum, and thence alone derive their nourishment; the ground there, too, is soon exhausted of that natural fertility and freshness so essential to the Peach.

The borders without, should, in the first instance, be properly prepared for the roots of the trees, and be afterwards left entirely in their possession, and no other tool than a fork should be used about them, to avoid doing them an injury; such is the practice at Montreuil, near Paris, where the gardeners cultivate the Peach to a greater extent, perhaps, and with more success, than in any other part of Europe.

Should the expense of building arches be objectionable, piers, at intervals of twelve or eighteen inches, the spaces between between them being covered with large stones or flags, may be substituted with equal advantage.

XV. *On the Management of* Grapes in Vineries. *By Mr.* William Griffin, *Corresponding Member of the Horticultural Society, Gardener to* Samuel Smith, *Esq. F. H. S. at Woodhall, in Hertfordshire.*

Read February 22d, 1820.

The commendation which has been bestowed * on the specimens of *Grapes*, which I have had the honour to exhibit to the Horticultural Society, and the assurance I have received that a communication of the particulars of my plan of managing the Vines which produced them, will be acceptable to the Society, have encouraged me to draw up the following statement.

There are several houses in the garden at Woodhall, in which Grapes are produced, in succession, for the supply of the family at the different seasons of the year; but that which I consider as best adapted to the purpose generally, is constructed as follows:—It is fifteen feet wide; the back wall, measuring from the level of the front wall plate, is thirteen feet and a half high; in front, above the wall plate, are upright sliding glass sashes, nearly eighteen inches high; the length of the rafters, which support the sloping lights, is, consequently, above eighteen feet. Were I to construct the

* September 1st, 1818. The Silver Medal of the Society was presented to Mr. William Griffin, for the skill displayed by him, in the cultivation of Pines and Grapes at Woodhall, specimens of each having been exhibited to the Society.

house anew, I should give more height to the upright sashes, perhaps a foot additional, which would elevate the lower end of the rafters, (and consequently shorten them a little), and give them less inclination. The house is one hundred and twenty feet long, being divided into two parts, each sixty feet long, and both these have in their length fourteen rafters, exclusive of those at their two ends. Each division has a separate flue. The flues are carried from the fire places, which are at the back of the house, along the middle, six feet from the back wall, and are returned along the front, passing afterwards into the chimnies at the back of the house, close to the fire-places. The sides of the flues are elevated above the surface of the mould; the bottom of that part of them which is in the middle, is a few inches below the level of the wall-plate, but the upper part of their front line is even with the wall-plate; consequently the front line is lower than the mi dle line: in front they are detached from the wall, a cavity of six inches intervening. I attach, however, no particular importance to this arrangement of the flues, (other plans may be equally as good), except that I consider the sparation of them from the front wall to be essential. The walk, which is two feet and a half wide, passes at the back of the flue, in the middle of the house, and between it and the wall is a border raised to the level of the wall-plate, three feet and a half wide, on which are grown winter sallads and spring vegetables. No use is made of the back wall: Grapes would not succeed on it, and other fruit trees would interfere too much with the Vines, which are the great object of cultivation. The border between the two lines of the flue is lower than the back border, and slopes to the

front; it is planted with Peach trees trained to a low trellis; the produce of these, however, is quite a secondary consideration, and perhaps it would be better if they were removed altogether, and the border only applied to the growth of small crops. The Vines grow in a border outside of the house, and are introduced close under the wall-plate.

The front wall, in the house I have described, and it should be so in all cases, is four feet from the level of the surface of the outside ground, to where it joins the wall-plate. At Woodhall the garden is on a declivity to the south, and consequently there are fewer steps to ascend to the doors of the houses, than if they were built on a level situation.

The original formation of the border on which the Vines are planted is of the first importance; they cannot succeed if the border is imperfectly prepared. The space allotted for this purpose must occupy twenty feet in front of the house, at which distance, and not nearer, if it be desired, a gravel walk may be carried. The border is formed in the following manner; One foot in depth of the mould from the surface is cleared out from the whole space; a main drain is then sunk parallel to the house at the extremity of the border, one foot lower than the bottom of the border; into this, smaller drains are carried diagonally from the house across the border. The drains are filled with stone. The cross drains keep the whole bottom quite dry; but if the subsoil be gravel, chalk, or stone, they will not be necessary. The drainage being complete, the whole bottom is covered with brick, stone, or lime rubbish, about six inches thick, and on this is laid the compost for the Vines.

The compost is formed of one half good loamy soil with its

turf, one quarter of rich solid old dung, and one quarter of brick and lime rubbish. The turf must be well rotted, and the soil and manure well united, by turning over together as often as may be necessary before the compost is mixed. When the two first ingredients are ready, and well incorporated, then, and not before, the brick and lime rubbish may be added to them. The compost, when prepared, must be laid into the cavity, and must be raised so much above the level of the ground, that, next the house, it shall be as high as the wall-plate, entirely concealing the front wall; and its surface must be sloped, so as to be rather more than three feet above the level, at the front of the border. It will settle considerably; time must therefore be allowed for this, before the Vines are planted, and additional compost must be added, to compensate for this settlement, and to keep the border to its proper thickness, which, from what has been stated, will be near five feet at the back, and four feet at the front, including the depth below the surface. In the border thus formed, nothing but the Vines should be allowed to be grown.

The best season for planting the young Vines is April; in constructing the front wall of the house, holes must be made in it, under each rafter, through which to introduce the Vines into the house; these, externally, must be nine inches below the wall-plate, and must pass in a sloping direction through the wall, so as to open from it on the inside, close to the wall-plate. Opposite to one of these holes, a plant must be turned out of the pot in which it has been grown; its stem must be drawn through the hole into the house, and the roots should be placed in a small quantity of mould, of rather better and

finer quality than the general mass of the border. By this mode the plant on the outside will be so completely buried, as not to be liable to injury from frost.

The first year's treatment of the young plant is as follows: When the stem has been brought into the house under the wall-plate, it will have been so shortened near to its entrance, as only to leave a good eye, from which a leading shoot will proceed; this shoot must be trained close to the adjoining rafter, without stopping it, but nipping off its lateral shoots to one eye, if they are weak, or to two eyes, if they are vigorous; for were only one eye left, when they are strong, they might break and grow. About Christmas, the shoot made in the year must be cut down to within two or three feet of the bottom, and the laterals must be cut close to the stem, leaving the bud at the joint; but if that bud has failed, or has been injured, which sometimes is the case, then the cutting off must be above the first bud of the lateral. As the buds which are left form the basis of the future spur, on which the fruit is borne, it will be obvious, that it will never be desirable to use the eye of the lateral, unless it be absolutely necessary; for when that eye is used, the future spur will be separated from the main stem by the first joint of the lateral; but when this cannot be avoided, it must be adopted, or so much fruit-bearing space would be lost. In cutting down to the eyes of side shoots, in all cases, the part of the shoot above the eye should not be taken off quite close; about one-third of an inch of its length should be left.

In the second year the leading shoot will be much stronger than it was in the preceding year; it must be trained its whole length up the rafter; in the same manner, and at the same

season, (about Christmas), it must be cut down to where it is perfectly sound, and with only a small pith in the middle.

If the plant be in health, and well managed, the sound part of the shoot which will remain, after it has been shortened, will, together with the last year's wood, extend from ten to fifteen feet along the rafter. On the spurs which will be formed afterwards on this second year's shoot, the best of the future crops of grapes will be borne; and of course, on the two essential qualities of the shoot, viz. good substance and shortness of joints, will the future prospects of the gardener depend. The laterals on this year's shoot must be shortened, and subsequently cut down to the eyes, as directed for those of the former year. Whilst the leading shoot is in growth, the eyes reserved on the preceding year's wood, will break and shew fruit; the shoots on which the fruit appears, must be shortened to within two or three eyes of the fruit, and when the pruning season comes, these shortened shoots must be pruned down to single eyes, at the base of each shoot, on the same plan as the pruning was managed in the former year. After two or three years, however, the spurs which are formed by the cutting down to the single eye in the young wood, will put out two or more shoots, on which fruit will be borne; in cutting down these shoots in the autumn, one eye may be left for each, so that in process of time, as the spurs grow older, several eyes will remain and will break on each spur, even to the number of six or eight.

In the third year, the leading shoot must be suffered to grow without being stopped, until the winter, when it must be cut off at the upper end of the rafter, and its laterals

must be treated and pruned as before described. The eyes on the one and two year old wood will bear in this year, and must be managed as explained in the directions for the preceding years.

The rafter will now have a single stem of bearing wood, extending its whole length; the single eyes which are left after the winter pruning, at each joint will, in each year, produce fruit, and will continue to do so for some years. The stem will have a disposition to produce from its end a strong leading shoot, but this must not be suffered to grow into length, it must be stopped during its growth in the summer leaving three or four joints at the utmost, and these must be cut away, at the time of pruning, down to the old wood, or nearly so; sometimes, to prevent the top of the house being crowded, a little of the old wood at top may be cut off also, and replaced by the next year's shoot.

The repeated cutting will form, in time, coarse and rugged spurs on the old stem: i is therefore desirable, when the stem is about ten years old, to cut it away entirely, having previously trained up from the bottom, in the two preceding years, a young stem to substitute in its place.

The above detail relates to the management of a single branch; in process of time, however, the plant becomes sufficiently strong to furnish wood, from the point where it enters the house, for a second and a third branch, and in some cases even for a fourth: such branches are, therefore, to be successively brought forward, and trained to the contiguous rafters, one bearing branch being applied to each rafter, and the plants which originally belonged to these rafters to be thus occupied, must be taken away entirely.

The Grapes which I have grown in the method above directed, are chiefly the following :—

1. The Black Hamburgh
2. The Black Prince
3. The Black Damascus
4. The Black Tripoli
5. The Black Tartarian
6. The Grisly Frontiniac
7. The White Frontiniac
8. The Sweet Water
9. The White Muscadine
10. The Ciotat or Parsley-leaved.

These are all hardy varieties, and perhaps my system is better suited to Vines of that character, than to more tender kinds, such as the Muscat of Alexandria, &c.

The produce of each rafter I generally estimate at about forty pounds weight of Grapes, growing usually two bunches at each spur; I gather from fifty to a hundred bunches from every rafter, and these average half a pound weight each bunch. I consider half a hundred weight of fruit from a rafter a very handsome produce; but I have had more even than that quantity from the true Black Hamburgh Vine.

When the house is in forcing, I suspend the branches from the rafter by strings from two to three feet long, fastened to nails on hooks on each side of the rafter; these enable me to let the branches down from the glass when I apprehend danger from frost, and to raise them again at pleasure, when the weather permits. I also contrive to spread the branches, when in bearing, on either side of the rafters, under the glass, but

so as not to occupy the whole space under the glass with the foliage, for I consider that very great advantage arises to the fruit from giving free admission to the sun from the centre of each light.

My system of forcing commences early in January, when I put on the sashes; no fire is used in the first week; in the second week a little fire is made every other night; the third week the heat is kept from 50° to 52° of Fahrenheit, and so I continue, not allowing the temperature to exceed 55° until the Vines begin to break; from that time until they blow, I keep the heat between 52° and 57°; and whilst they are in bloom, the heat is raised to between 57° and 65°. Air is regularly given plentifully through all these stages, until the bloom appears, when the house is kept close, except the sun be very powerful. When the bloom is past, attention is paid to thinning the grapes; a regular heat is then kept up, and air in due quantity, as the weather permits, is admitted, observing to give a larger proportion when the heat of the sun is strong, and always shutting up the house early in the afternoon. I generally contrive to have my chief crop of Grapes ripen about the latter end of July.

The stems of the Vines, especially at the lower part, near the flue, should, from the time that the house is shut up and heated by the fire, to the time that the bunches first shew themselves, be moistened with water gently applied with a syringe, so as to keep the stems from becoming dry and hard. This materially facilitates the production of healthy and good fruit.

XVI. *On the Means of Destroying* Wasps. *In a Letter to the Secretary. By Sir* Thomas Frankland, *Bart. F. R. S. &c.*

Read, March 21st, 1820.

Dear Sir,

I need not mention how destructive *Wasps* were in the last season, but how I got ahead of them may be worthy of notice. Our first alarm was on a bed of red Chili Strawberries, the fruit of which being borne high up, must have occasioned this bad choice, for the adjoining fine bed of black Strawberries, in which the fruit grows near the ground, was scarcely touched. The Cherries were next devoured, without any seeming possibility of defence; then followed the more forward Grapes, the Frontiniacs being soon cleared, though the Muscadines were untouched. On this, we secured all the remaining bunches by exertion in making bags of foundation muslin, which is impenetrable. At the same time we gave rewards for the destruction of nests of wasps, and, as is usual, hung up phials, which were cleared out two or three times a day, without gaining any ground. I then tried a small landing net (which had been used for catching trout flies) with a wire hoop six inches in diameter, a purse of Scotch gauze sixteen inches deep, and a two feet handle, the effect of which soon became visible, for by holding it on, or under any fruit, the wasps fell blundering into the net, and were then easily crushed by a piece of wood (I used a blank butter print, as being conveniently held), or a hedging

glove on the left hand, in such numbers that my gardener counted upwards of two hundred and twenty at one haul from two Apricots. We then made more nets, and by perseverance soon turned the tide, so that scarcely a wasp could escape us, whether on espaliers or wall fruit, to feed being certain death; and we had consequently Moor Park Apricots in perfection till September 16th, the Peaches and Nectarines on open walls being also almost untouched.

I wish that I could confirm the effects in attracting wasps, attributed to Hoya Carnosa,* and Yew berries.† My gardener saw not less than two hundred wasps on one bunch of black Hamburgh Grapes, in a neighbouring hot-house, close to a plant of the Hoya, in the richest flower, which was untouched; and my own observations only go as far as a solitary bee feeding on it. As for Yew berries, I saw wasps passing numerously by an abundance of them in a very thick hedge, in their way to the closely adjoining hot-house, at Studley, in which the bags, improperly made of Scotch gauze, (which by its transparency increases the temptation), were eaten through, and full of these pests of the garden.

I remain,

Your's truly,

THOMAS FRANKLAND.

Thirkleby, near Thirsk, March 12, 1820.

* See Horticultural Transactions, Vol. II. page 197.

† See Horticultural Transactions, Vol. III. page 259.

XVIII. *On the Treatment of the* Neapolitan Violets, *so as to make them produce a Succession of Flowers through the Winter. By Mr.* Isaac Oldaker, *F. H. S. Gardener to His Majesty the Emperor of Russia.*

Read March 21st, 1820.

The *Neapolitan Violet*, which is called in France the Violet of Parma, is sufficiently distinguished from all the other varieties of the Viola odorata of Linneus, by its pale blue flowers, which are rather semi-double than full double. The flowers have the peculiarity of growing on longer footstalks than any of the other kinds, which makes them much more useful in forming nosegays. The plants when sheltered or protected from severe weather are disposed to produce their blossoms through the whole winter. The treatment required, to enable them to do this in perfection, is the object of the present communication.

A compost, formed one half of fresh turf loam that has been turned over two or three times during the summer, and one half rotten dung, must be well mixed together, and be ready by the end of September; at which time the Violet plants must be raised from the bed in which they have grown during the summer, with as much earth to their roots as possible. They are then to be divested of all their side branches, or what are commonly called Runners by the gardeners. The proper sized pots for the purpose are those which are seven inches wide at top and six inches deep, be-

ing what are usually called about London, wide-mouthed thirty-twos. One strong plant is to be planted in each pot, but when the plants are weak, two, three, and sometimes four, according to their size, must be put together, so as to have the appearance, when planted, of only a single root. It is necessary to put plenty of broken pot-shards in the bottom of each pot, so that the water may pass off freely, but I have in the last two years used a handful of ground bones, instead of the shards; this has answered admirably, for the roots of the Violets lay hold of the bones, which giving vigour to the plants, makes them produce considerably more flowers, as the specimens exhibited to the Horticultural Society in the last and present spring evince.

Having potted as many as are necessary for the season, a plentiful supply of water is given to each pot, to settle the earth well to the roots of the plants. A sufficient number of Melon frames, with the glass lights belonging to them, must be provided and arranged in a row, in a southern exposure, to which the sun can have free access during the winter. The frames must be so placed that the glasses may have sufficient slope to let the rain which may fall on them pass off rapidly, and not allow of any drip, which in the winter time would not only have a tendency to rot the plants, but would also cause the flowers to be produced very sparingly, and of a pale colour.

The frames being thus placed, a layer of old tan (which has been thrown out of the Pine stoves) four inches thick, is thrown into them, and in this the pots are plunged up to their rims, beginning at the back of the frame, and arranging them in rows in succession till the frame is filled. It will

be necessary to leave three inches space between the pots, where the plants are large, that the air may pass freely between them, and thus keep off the damp; which, when it prevails, destroys the plants; but if they are so small that they do not cover the tops of the pots, then the pots may be placed nearer, it being always expedient to leave three inches space between each plant.

When the plants are adjusted, the lights must be put on the frames. When the heat of the atmosphere is above 50° the lights are pulled entirely off in the day-time, and at night are raised, by tilting behind six inches, for the admission of air. When the external temperature is below 50°, the lights should remain on, but then air must be admitted behind, in the day time. When the atmosphere is below 40°, the admission of air is not necessary. At no time after the Violets begin to blow must the lights be entirely taken off, except for the purpose of watering and cleaning the plants, and of gathering the flowers, as exposure to the sun and wind will cause the flowers to be of a pale colour. When the weather is cold, and likely to be frosty, the glasses should be covered at nights with one or more mats; the thickness of the covering must be in proportion to the severity of the weather; in hard frost, two mats, as well as litter, will be required, for the pots must never be suffered to freeze, if it be possible to prevent it. The coverings must be removed in fine days. In March and April as much air as possible may be given, if the weather is fine.

The pots must be frequently examined, at all times when the weather will permit; weeds and decayed leaves must be then cleared away, and a little water given where the mould

has become dry; but particular care must be taken, in the depth of the winter months, to wet the plants as little as possible, moisture being very injurious to them in that season of the year. In March and April, when the weather is fine, and a free admission of air is given, a plentiful supply of water is necessary, as the plants, in those months, will be in a vigorous state of growth, and if well managed, they will then produce an abundance of flowers, and consequently require more moisture than in the former months.

By the end of April the plants will have ceased to produce flowers for the season; they are then to be turned out of the pots and divided, some into five or six, others into two or three, and some not at all; for if the parts are made very small they will not become sufficiently strong by the time they are wanted for potting in the autumn.

As soon as the plants are divided, they are to be planted, with a dibble, a foot apart, in the manner of Strawberries, in rich ground, under a north wall. In the spring of 1819 I put a strong coat of ground bones upon the border when I planted the Violets; they grew unusually strong, and are now the finest I have ever had, notwithstanding the severe winter which we have experienced. The plants must be kept clear from weeds during the summer, and watered only in very dry weather. It is necessary that more than double the number of plants which may be wanted in autumn should be planted in the spring, to allow of a selection of the best for potting; the number potted at Spring Grove for the season being from three to four hundred, I put out in the spring from eight to nine hundred plants, which give me an abundant choice.

The following statement of the gatherings made at Spring Grove in the last season, under the treatment above described, will not only shew the entire period of the produce, but the regularity with which the supply of flowers is obtained. The flowers are usually gathered into bunches of two dozen each, and the account of them is kept in dozens.

Particulars of the Violets gathered at Spring Grove, from the 10th of October 1818, *to the 29th of April* 1819, *from three hundred pots of plants.*

1818.			1818.		
October	10.	6 doz. flowers	November	21.	9 doz. flowers
	13.	3		24.	4
	15.	4		26.	3
	17.	7		28.	6
	19.	12	December	1.	8
	22.	6		5.	7
	24.	12		8.	7
	27.	12		10.	6
	29.	9		12.	5
	31.	3		15.	5
November	3.	7		17.	3
	5.	9		19.	3
	7.	7		22.	3
	10.	7		24.	11
	12.	9		29.	2
	14.	6	1819.		
	17.	8	January	2.	3
	19.	7		5.	9

1819.		
January	9.	12 doz. flowers
	12.	4
	14.	7
	16.	7
	19.	7
	21.	4
	22.	9
	26.	10
	28.	9
	30.	16
February	2.	15
	4.	9
	6.	9
	9.	9
	11.	12
	13.	20
	16.	21
	18.	19
	20.	24
	23.	26
	25.	18
	27.	20
March	2.	34
	4.	18
	6.	16
	9.	18

1819.		
March	11.	20 doz. flowers
	13.	28
	16.	26
	18.	18
	20.	22
	23.	24
	25.	18
	27.	18
	30.	16
April	1.	16
	3.	36
	6.	16
	8.	20
	10.	48
	13.	24
	15.	9
	17.	20
	20.	14
	22.	9
	24.	9
	27.	6
	29.	6
Total.		1024 doz. flowers

Subjoined also is an account of the number of pots of Violets used in each year, and of the quantity of flowers pro-

duced from them, since I have cultivated these plants for Sir Joseph Banks.

In the winter of		were gathered
1816 and 1817, from	300 pots,	566 dozen flowers.
1817 and 1818,	400	1062
1818 and 1819,	300	1032

I attribute the proportional increase of the second season to my becoming more experienced in the proper mode of treatment; but the great addition of nearly one-fourth of produce in the third season, was certainly occasioned by the use of the bones; to which the flourishing condition of the plants, when I took them up last autumn, is also attributable.

XVIII. *Instructions for Forcing* Cherries. *In a Letter to the Secretary. By Mr.* Thomas Torbron, *Corresponding Member of the Horticultural Society, Gardener to the Earl of* Bridgewater, *at Ashridge, Hertfordshire.*

Read March 7th, 1820.

Sir,

It is many years since I first had the management of *Forcing Cherries*, at Petworth, where the Earl of Egremont kept a house * for that purpose, sixty feet long by about thirty feet wide, and in which were two pits, the whole length of the house; each pit was nine feet nine inches wide, with a walk all round and between them; and though I have had considerable practice, yet I confess, it is with much diffidence and reluctance that I have been persuaded to write on the subject.

The trees which I forced were May Dukes, from four to eight or ten years from the bud, and selected of such various heights as best suited the size of the house, and the slope of its roof, so that when planted none of those in front might obstruct the rays of light from those placed behind.

Cherry trees for forcing should be planted as early in the autumn as the season will permit, either in a prepared border of fresh virgin soil, inside the house, mulched and watered in summer, or in pots, tubs, or boxes, filled with such earth, having mixed therewith one-third or one-fourth of rotten dung; the pots, tubs, &c. should be afterwards plunged

* This house was some years since pulled down.

to their rims in an open exposure, and be mulched and liberally watered during the summer months.

If the trees that are to be planted in the inside border have been nursed near to the forcing-house, and in a soil so adhesive that a considerable ball of earth can be retained at their roots when removed, they may be very gently forced the ensuing spring; but if they be permitted to have two summers growth before they be forced, their success will be more certain, as I have always found. The trees planted in pots or tubs, &c. should not be forced till after being two summers established, as their roots will, of necessity, be more shortened than those put into the border. I have had an abundant crop of fine Cherries from trees which had been planted only a few months before forcing, but would not recommend the risking a whole crop, unless the trees have been longer established.

Where a portion of wall (especially with a southern aspect), already well furnished with May Dukes, perfectly established, and in a bearing state, can be spared for forcing, a temporary glass case may be put up against it; the flue may be built on the surface of the border, without digging, or sinking for a foundation; neither will any upright glass or front wall be requisite; the wooden plate on which the lower end of the rafters are to rest may be supported by piles, sunk or driven into the soil of the border, one pile under every, or every alternate rafter. The space between the plate and the surface of the soil should be filled by boards nailed against the piles, to exclude the external air, for the plate must be elevated above the level of the surface from eighteen to thirty inches, or whatever height may be sufficient to let the sashes

slip down, in order to admit fresh air. I believe this to be an uncommon structure, and it may perhaps be objected to; but I am confident that it will suit well for Cherries, for I have constructed such places even for forcing Peaches, with good success, as well as for maturing and preserving a late crop of Grapes. In such a building I have kept Grapes fit for use till the middle of February, for three or four years in succession.

If Cherries be required to ripen early in the season, the house must be shut in, about the beginning of December, and the fires lighted about the third or last week of that month. For the first three, four, or five weeks of lighting fires, if the weather be so severe as to depress the thermometer in the open air from 22° to 12° of FAHRENHEIT, then let the thermometer inside the house be kept from 35° to 40°, or just sufficient to exclude the frost. If the weather be not severe during the above period, the thermometer may be kept to 45° inside the house. As the season advances and becomes more mild, and the days longer, probably about the first or middle of February, the thermometer may be raised to 50°, and then it is expedient to give gentle sprinklings by an engine or syringe two or three times a week, in the evening. Whilst the trees are in bloom, no sprinkling must be used; but the flues are to be steamed * morning and evening, and every day or hour of sunshine, and calm and mild weather, fresh air must be copiously admitted. When the petals begin to drop, and when the fruit is set, the temperature may be raised to 55°, the house being engined three or four times

* When the flues are very hot it is dangerous to pour or to sprinkle water upon them, lest the hot steam should injure the tender leaves, flowers, &c.

a week in the evening; but never till the bloom is all down. When the Cherries are completely stoned, the thermometer may be raised to 60° by fire heat, sprinkling every evening by engine, till the fruit is nearly ripe; the house may be kept higher by day, as well as by night, after stoning.

Frequently there will be more fruit than the trees in the pots can bring to full size; when that is the case, the overplus should be cut out by scissars; but this must not be begun till the stones are become hard. From the time the flower begins to open, till the fruit is completely stoned, the soil should be but sparingly watered; but when the stoning is effected, water may be applied to the roots freely, till the fruit is nearly ripe.

The Cherry, in forcing, requiring more fresh air than most other fruits, particular attention must be paid to its admission, by the gardener having it in his power occasionally to make as many inlets or openings (by pulling the sashes down or up) as convenient. It will be conducive to this end, that each of the roof sashes be moveable, the upper ones to be easily let down, and the lower ones (if there are two lengths in the roof,) to be either pushed up or let down, as may be required; the upright or front sashes, if any, ought also to be moveable, and all with little difficulty, because in changeable weather the current of air may be required to be augmented or reduced many times in one day. Air must be admitted freely and copiously when the weather is mild and calm, and accompanied with sunshine, during the time the Cherries are in bloom, and also near the time of their ripening.

The insects that infest the Cherry Trees are the *Black Flies*. These may be easily destroyed as soon as they appear,

by strong and frequent fumigations of tobacco. There is also a small insect, scarcely half an inch in length, having a blackish head (known by the name of a *Grub*); this is very destructive, feeding on the young fruit and leaves; it is frequently enveloped in a leaf. I know of no effectual remedy to destroy this voracious intruder, but that of picking it off by the hand, which, although it be a tedious task, must be performed till a more expeditious way of removing it shall be discovered.

I am, Sir,

your most obedient humble servant,

THOMAS TORBRON.

Ashridge, 24th February, 1820.

XIX. *Observations on, and Details of, some Experiments in* Ringing *the Bark of Fruit and other Trees and Plants. By* Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read March 21, 1820.

The publication of the Papers, on *Ringing the branches of Fruit trees*, by Dr. Noehden, in the second volume of the Transactions,* has directed the attention of several Fellows of the Society, and other persons, to the subject. The results of those experiments which have been communicated to me, appear to be of sufficient importance to be collected together; as they will serve as guides to those who may wish to make further trials, and will assist in ascertaining the causes of the variety of effects which appear to attend the operation on different plants.

The practice of ringing or circumcising the branches of fruit trees, in order to make them yield more produce, is not novel; it is not stated to be so in the Papers alluded to; but though occasionally used, it does not appear that much enquiry has been made to discover the most advantageous method, or the proper seasons, for performing the operation; nor have any reasons been distinctly assigned why it should be so particularly successful in some instances, and so entirely devoid of benefit in others.

* Vol. II. pages 262 and 384, and Appendix, page 1.

The production of a greater crop of fruit is the most important of the advantages expected to ensue from ringing; this increase must, of course, arise from an additional number of blossoms, and, in some cases, from blossoms that would not have existed in the ordinary course of nature, without the intervention of ringing; the formation of flowers is therefore the point to be looked to, in considering the application of the practice. In those trees where the blossom buds are produced on the wood of the preceding year, it is not to be expected that the operation will have any effect on the quantity of produce in the year in which the rings are cut; and it is on trees of this character that ringing has been chiefly practised. On the contrary, in those trees which produce the flowers on the present year's wood, (though not much has yet been learned from experiment with respect to them), the effect of the ringing will be seen immediately.

The interruption of the passage of the descending sap, by the incision in the bark, causes, in some cases, an alteration in the quality and appearance of the fruit. In many instances, in the first produce after the operation, it is considerably increased in size on the ringed branches; it is also ripened earlier in the season, and that circumstance is accompanied with very extraordinary improvement in those colours of the skin which indicate full maturity.

Taking, therefore, into consideration the expectation of a change both in the quantity and quality of the fruit, it will be obvious that the spring is the most proper period to cut the rings; the bark is then very readily detached, and the work may therefore be done with greater ease at that season.

With respect to the width of the incision, it must be recollected that the separation of the communication of the bark, in every case, though in some more than others, materially affects the health and vigour of the branch. As long as the separation is kept up,* so long may the formation of additional blossom buds be expected; but the restoration of the communication, which will be the consequence of the union of the bark from the opposite sides of the ring, puts an end to the whole of that unnatural process which the interruption had occasioned. It is therefore requisite, that the bark should be separated nearly the entire season in which the ring is made, more especially in those trees where an increase of the succeeding year's bloom is intended to be produced; but it is not advisable, in any case, to keep the ring open for a long period; the deposit of alburnum at the upper edge of the ring, caused by the stoppage of the passage of the descending sap, increases the size and weight of the branch in that place so much, whilst the under part remains of its original size, that it is very liable to be broken short off at the ring, if the bark be suffered to remain long disunited.

Having taken this general view of the subject, I proceed to the consideration of the application of the practice to the different kinds of fruit trees, as far as my own observation, or the experiments of those with whom I have corresponded relative to it, will enable me.

* Since this Paper was read to the Society, Mr. Williams, of Pitmaston, has mentioned to me, that a ligature on the branch, by a waxed string tied tightly round it early in May, produces nearly the same effect as ringing. In this case, although the downward flow of sap from the leaf is in some measure prevented, the alburnum is not injured by exposure to the air, and there is less obstruction given to the ascending sap, so that the health of the branch is preserved.

All Apple trees form an abundance of additional flower buds in consequence of ringing; but if the ring be wide, the ringed branches, especially young ones, speedily become sickly; it is therefore advisable, with them, not to cut rings of greater width than what will be closed up at the end of the same season, or early in the following year; besides, it seems that the improvement in size and beauty is obtained chiefly in the first year of the ringing, therefore the rings on Apple trees certainly should not exceed a quarter of an inch in width, on strong branches, and they should be narrower on small and weak shoots. Fresh branches on the same tree ought to be annually ringed, and thus a succession of produce be uninterruptedly kept up. Mr. Twamley, of Warwick, exhibited * to the Society, in the autumn of 1818, some specimens which fully illustrate the practice of ringing Apple trees. In the spring of 1818 he ringed several espalier trees; some of which were the Minshull Crab, the Courtpendu Apple, and the French Crab; the two former produced some of the most remarkable specimens of the kind from the ringed branches, as to beauty, which perhaps were ever seen, the colours being most brilliant, whilst the Apples from the unringed branches of the same trees had their usual appearance; but the size of neither of these kinds was altered, whilst the French Crabs from the ringed branches were enlarged in an extraordinary degree, as well as improved in appearance. The same trees in 1818 had borne great crops on every branch, whether ringed or unringed; but in 1819, they did not produce a single Apple, except on the ringed branches, which then afforded a good crop, but the fruit, though very

* See Horticultural Transactions, Vol. III. p. 367.

beautiful, were not so splendid in appearance as in the former year, and the French Crabs were not larger than usual. Mr. TWAMLEY has observed, that the rings made in horizontally trained branches do not so readily close up as those on upright growing ones; and he found an advantage in protecting the exposed part of the wood at the ring, during the summer with grafting clay. MR. HUNT, of Stratford-upon-Avon, having observed Mr. TWAMLEY's success, tried the same experiments with trees in his own garden, in 1819, particularly on the Ribston Pippin, the Nonpareil, and Scarlet Nonpareil. He made his rings a quarter of an inch wide at the end of April, and beginning of May, and in the winter covered the open rings with clay and cow dung. The Ribston Pippin filled up its rings more rapidly than the other kinds, in consequence, as I suppose, of its being more vigorous in its general habit. The fruits of all, in comparison with the produce from the unringed branches, were, exclusive of the additional quantity, either altered in size or in colour, but did not keep so well; and Mr. HUNT thought them inferior in flavour, which is the natural consequence of the increase of size. The Ribston Pippins, from unringed branches, were of a pale greenish yellow, and averaged eight inches in circumference; those from ringed branches were of a rich golden colour, with brilliant red streaks on the exposed side, and were ten inches in circumference. The Nonpareil tree* was trained to a wall, and its produce was all consequently large; but those from the ringed branches were highly improved in colour, and measured twelve inches round. In the Scarlet Nonpareil there was no difference in

* This was the sort usually called the Green Nonpareil.

colour,* but those from ringed branches measured ten inches in circumference, while those from unringed branches measured only eight.

Pear trees do not suffer so much from ringing as Apple trees; the ring, though kept open, does not appear to induce weakness so speedily: the ringed branches do not make shoots in such numbers, nor in such vigour, but they retain their health sufficient for all purposes of produce many years. Indeed, so little injury is done to Pear trees by ringing, that several branches may be kept cut at one time without danger, and a continuance of crop may be secured by occasionally taking out a branch which may have become decayed, and replacing it with new wood. In healthy and clean shoots the bark of Pear trees soon restores itself over the ring, unless it is cut very wide. The effect of ringing them is a certain production of blossom buds, so much so, that even young trees may be brought into bearing by this means. Mr. Twamley, in the spring of 1818, ringed a branch of a young and luxuriant Jargonelle Pear tree, which had been planted only two years; the ring closed itself at the end of the summer; but the branch next year blossomed, and brought to perfection five good Pears, (shooting vigorously also), when no other part of the tree shewed the least appearance of bloom, and even in the present spring it shews two branches of blossom, which are the only ones upon the tree. Mr. Hempel† mentions that he had increased the size of

* The Scarlet Nonpareils from ringed branches in Mr. Twamley's garden, were, however, much more brilliant in colour than the other Apples on the same tree.

† See Horticultural Transactions, Vol. II. Appendix, 1.

the fruit of Pear trees by ringing: this is most probable, but an instance of it has not occurred to my observation.

The branches of Plum and Cherry trees sustain injury, and become cankered, by ringing; but as they are always free blowers, an increase of blossom by artificial means is not wanted to make them produce fruit. The same observation is applicable to Peach and Nectarine trees; so that all the stoned fruits cultivated in this country must be excluded from the list of trees on which ringing may be usefully performed.

Vines are much benefited by ringing; their blossom is produced on the shoots of the same year in sufficient plenty; for additional blossom, the use of ringing is not therefore required, but increase of size, early ripening, and improvement of flavour in the Grapes, all result from ringing. Mr. Williams, in a Paper on the subject in the first volume of the Transctions,* has sufficiently described the mode of proceeding with the Vines for this purpose.

In none of the experiments, the termination of which I have yet become acquainted with, has success attended the operation of ringing the Fig tree. The branches which have been circumcised have put forth on the young wood abundance of small Figs, such being in fact the flower of the tree, which subsequently enlarges and becomes the fruit, when ripe. This production of fruit has even been effected in trees which had not attained sufficient age to throw it out naturally in the regular course, but in such cases, the crop has fallen off without ripening. The branches of the Fig tree suffer by ringing; the incision should therefore, when

* Vol. I. page 107.

made, be very narrow, to admit of speedy closing, it not being necessary for the production of the blossom (which is formed on the young wood), to keep it so long open as is required in other fruit trees.

The preceding are all instances of the effects of ringing in the production of fruit; but as these incisions in the bark cause the formation of flower buds when none, or only a few, would otherwise have appeared, the practice may be extensively and usefully applied to ornamental shrubs and plants, which do not readily blossom. I believe this use of ringing has not before occurred to the advocates of the practice, and as I am acquainted with some cases of perfect success, it will be worth while to enumerate them, in order to induce to further trials.

Mr. William Baxter, gardener to the Comte de Vandes, at Bayswater, has given me the particulars of three experiments, made in the spring of 1818, which fully answered his expectations. The first was with a Waratah Camellia, which he had never been able to make flower; he cut a ring round the stem, so close to the root that he was able to cover the incision with the mould of the pot in which the plant grew; the ring closed at the end of the year, and the plant remained in good health, but made rather short shoots, on which an abundance of flower buds were formed, and these blossomed perfectly in the following spring. The second experiment was on a plant of Aubletia Tibourbou, in the stove; the ringed branch speedily broke into flower; it was the first blossom which the plant had yielded, but its other branches did not blow; the ringed branch is still alive, and its bark nearly reunited. The third experiment was on

branches of a Pyrus spectabilis; those which were ringed produced, last spring, abundance of splendid flowers, which were succeeded by ripe fruit; and they are now again full of blossom buds, the other branches shewing little promise of bloom.

In addition to the above, I can state, that one branch of a Passiflora alata, in Messrs. LODDIGES' stove, was ringed in June 1818; in two months after it produced flowers: it also did the same abundantly last year, whilst another branch, that remained unringed, was entirely unproductive in both seasons. Mr. GEORGE LODDIGES, in giving me this account, mentioned, that he had tried the same experiment with other Passifloras, and with some stove plants, but that he had not succeeded. His failure may probably, in some cases, be attributed to his having made the rings too narrow; in the soft-stemmed plants which he ringed, the bark would reunite very rapidly, and if the separation is not kept open sufficiently long, the desired effect will not be produced.

XX. *Notices of Communications to the* Horticultural Society, *between May* 1st, 1819, *and February* 1st, 1820, *of which Separate Accounts have not been published in its Transactions. Extracted from the Minute Books and Papers of the Society.*

MAY 4th, 1819. Sir THOMAS FRANKLAND, in a communication to the Secretary, read this day, stated the *effect of Charcoal* in restoring to health a Hyacinth root, which in January last was prepared for blowing in water, and after being a short time in the glass, threw out only a few fibres, which soon died at their extremities, the bulb becoming offensively putrid. A table-spoonful of powdered Charcoal was stirred into the water, which immediately corrected the bad smell; but on the second morning after, it began to return. Charcoal and water being renewed three times, at two days interval, the root became perfectly sweet, and flowered as well, and nearly as soon as one of the same variety (Groot Vorst), which was placed on the chimney-piece near it.

MAY 18th, 1819. Mr. THOMAS JAMES, gardener to ARCHIBALD PARIS, Esq. at Beech Hill, near Barnet, having, in the last year, exhibited some well grown *Onions* to the Society, communicated the method in which they had been managed, the peculiar advantage of which, as Mr. JAMES observes, is, that good Onions may be obtained by it, on a very

moderate soil, without the abundant supply of manure which broad-cast sowing requires. The seed is sown on a slight hot-bed in the second week in March; the plants, when up, are exposed to the air whenever the weather permits, and in the last week in April they are planted out in the following manner. Deep drills are made on a piece of well dug ground, fifteen inches asunder, and the drills are filled with good compost of equal parts of sandy loam and rotten dung; the plants being drawn carefully from the bed, are placed in these drills, at twelve inches distance from each other, their fibres only being covered with the mould, and the entire bulb kept above ground. When planted, they receive a gentle watering, which is continued daily, unless rain falls, till the roots have got hold of the compost; they are afterwards hoed, when necessary, and occasionally watered till they are fit to take up. Mr. James has found, that by sowing Onion seed on a good south border the second week in September, the plants, if of a hardy variety, will stand the winter; and they may be treated in the spring as above described, with equal success as if they had been raised in a hot-bed.

At the same Meeting. Mr. John Thompson, a Corresponding Member, communicated to the Society *a Method of preserving Grapes*, till very late in the season, which is practised by him with success in the garden of Earl Cowper, at Panshanger, Hertfordshire. The Grapes are ripened in the vineries under the glass, but without any artificial heat. In the autumn, as soon as the weather becomes damp, he lights fires in the flues about 9 or 10 o'clock in the morning, giving plenty of air at the same time; the fires are put out in the afternoon, and the houses are closely shut up at night.

This is continued daily, as long as the crops of Grapes remain in use. The fire in the day, aided by the circulation of the air, renders the whole interior of the houses perfectly dry, so that no damp exists in them when shut up; a night fire, on the contrary, with the houses closed, creates a vapour, which causes the fruit to become mouldy, and to decay. With the treatment above described, Mr. THOMPSON has Grapes in perfection all the latter part of the year, and even till the beginning of February, at which time, though somewhat shrivelled, they are perfectly good. The sorts of Grapes he thus cultivates are the Grisly, Black, and White Frontiniacs, the Dutch Sweet Water, and the Black Damascus.

At the same Meeting. A communication was read from Mr. THOMAS BLAKE, gardener to JAMES VERE, Esq. of Kensington Gore, describing his *treatment of the Azalea Indica*, and his method of bringing it into flower *early in the season.* The compost in which he keeps the plants is peat earth, to which has been added one quarter of leaf mould, or, if that cannot be procured, of rotten dung very much decayed. The young plants, which are struck in the summer, grow about nine inches high before the winter; these are kept in small sixty-sized pots through the winter, and in spring are shifted into large sixty-sized pots. In two or three months the roots will fill the pots, when they are again shifted into some of a larger size. The young plants are thus changed into new and larger pots twice in every year, during the summer, until the autumn of the third year, when their buds begin to swell, and to shew for flower. Mr. BLAKE does not suffer the leading shoot to hang loose, but

keeps it always tied up to a straight stick; this, he conceives, encourages the growth of the plant as well as keeps it in a handsome form. The plants are kept in the green-house, as near the glass as possible, and have as much air as can be given; but they are never taken out of the house, and they are always kept damp by means of pans placed under the pots; it is not necessary, however, to keep water continually in the pans, as if they were aquatics. When the plants are in a flowering state Mr. BLAKE removes them into the hot-house, about January, the sudden heat causing the blossom to expand better. In about a month half of the flowers will have opened; the plant is then replaced in the green-house, where it continues in beauty about six weeks. On the 16th of February, Mr. BLAKE exhibited to the Society a plant upwards of six feet high, in full blow, and in great beauty, especially considering the season of the year.

JUNE 1st, 1819. Mr. JOHN NAIRN, F.H.S. gardener to JOHN CRESSWELL, Esq. having exhibited, on the 16th of March, a plant of *Azalea Indica*, in peculiarly splendid flower, and with its foliage very perfect, was requested by the Council to describe his plan of management, which differs from that of Mr. BLAKE, above described. The soil which Mr. NAIRN uses for this shrub is the most fibrous part of peat earth, well rubbed through a sieve, with one-sixth of pure fine white sand added to it; when planted, the plants are pressed into the soil rather firmly. By placing them in a strong heat, through the summer, and shifting them into larger pots as often as their roots fill those which they are in, they will attain a considerable size in one season. But

whether they are kept in the stove, or green-house, it is essential that they should be in the shade, as the sun scorches and spots the leaves, and gives the plants an unsightly appearance. When his plants exhibit blossom buds, Mr. NAIRN keeps them in a temperature from 50° to 60°, by which means they flower in March, and the blossoms exhibit their contrasted colours in greater brilliancy than when forced early.

At the same Meeting. Dr. HILL, whose account of the beneficial application of *Oxygen Gas* in promoting vegetation, has been published in a former volume of the Transactions,* this day exhibited a farther proof of the utility of it, in its operation on an *Orange tree*, which was in the fullest vigour and luxuriance. The account of this new experiment is thus detailed by Dr. HILL. The plant now shewn had been put aside in his garden in Russell Street, being, to all appearance, dead, and had remained exposed for some weeks; in this state it was re-potted in common mould, and placed, in July last, in the window of the drawing-room, which has a south aspect. New River water, saturated with oxygen gas, was sparingly but regularly supplied to the soil and roots for some time; in the course of a few weeks, fresh shoots progressively extended themselves, and during the autumn surrounded the old stump with considerable strength. The mildness of the autumn and winter allowed the new branches to ripen, and in the spring the plant attained its present favourable appearance, assisted by the continuance of the application of the oxygen gas through the medium of the water

* Vol. I. page 233.

JUNE 15, 1819. A Paper on the *destruction of the Moths and Caterpillars of the Phalæna brumata* of LINNEUS, by Mr. RANSLEBEN, of Berlin, a Foreign Corresponding Member of the Society, was read. This is the insect which annually destroys a great quantity of the blossom of all kinds of fruit trees; the caterpillars are about half an inch in length, and of a green colour. As soon as they attain their full growth, which is about Midsummer, they descend to the ground, and working themselves either into it, or into the crevices of the bark of the tree near the root, are changed into chrysalides; their metamorphosis into moths takes place between the end of October and Christmas, at which time vast numbers may be seen in a mild day about the roots of the trees. The females are nearly apterous, as the little feeble wing which they possess hardly deserves that name, and does not enable them to fly. From this circumstance arises the means of their destruction, or at least of their great diminution. As soon as the female is ready to lay, she ascends the stem of the tree, endeavouring to creep up to the branches, on which she may deposit her eggs. To interrupt her in her ascent, Mr. RANSLEBEN recommends, from experience of its efficacy, the besmearing about four or five inches of the trunk of the tree, all round, and near the bottom, with tar, which being renewed daily, or as often as it becomes dry, catches the insect in her progress, and thus multitudes are destroyed. Mr. RANSLEBEN further recommends, that as soon as the caterpillars are observed in the summer on the trees, that their branches be well shaken, the insects will then fall to the ground, on which they may be easily destroyed. Mr. MAC LEAY, to whom the consideration of this commu-

nication was referred by the Council, observes that a mixture of oil and tar is preferable to tar alone, because such mixture will keep moist for a long time; and if the ring be made even broader than is here proposed, no injury will be done to the trees thereby, and it will protect the bark from the bite of hares and rabbits, if the trees be in a situation exposed to their attacks. Mr. Mac Leay also suggests, that as it is this same caterpillar, which is so destructive to Rose buds, the application of the ointment to the stems of Rose trees will be serviceable.

At the same Meeting. *Seeds of a new Cucumber*, which had been transmitted by Dr. Wallick, Superintendant of the Botanic garden at Calcutta, a Corresponding Member of the Society, were distributed. The following is the account given of this Cucumber by Dr. Wallick; the fruit usually weighs upwards of twelve pounds weight, measures in girth twenty-four inches, and in length seventeen inches; it was sent to him from Napal, by Lieutenant Boileau, commanding the Residency escort at Katmandie. The plants raised from these seeds, though sown late in the season, have produced Cucumbers of extraordinary size, though not equal to that above stated. Their flavour has been thought by some persons more pleasant than that of our common Cucumbers, and for stewing they are considerably superior.

At the same Meeting. Mr. Henry Shailer exhibited a *singular Flower from an Apple tree*, in his garden, at Little Chelsea. It was a complete double blossom, nearly two inches in diameter, and spreading flatly, very much in the manner of a Carnation. The tree from which it was gathered, occasionally produces flowers of this description,

besides its usual flowers; it is called Lucas' Incomparable. It is, in general, a good bearer, and produces fruit of a large size, which are much esteemed as kitchen Apples, being remarkably good boilers. They are singular in having very small cores, some of them are even without any; this unusual circumstance probably arises from a defect in the formation of the flowers, which appears, by the doubleness of some of them, to be subject to deviation from regularity in the arrangement of their parts.

At the same Meeting. Mr. Shailer also exhibited a collection of specimens of nine kinds of *Moss Roses*, sufficiently different from each other to be considered as distinct varieties. They were named: 1st, The Single Moss Rose; 2nd, The Semi-double Moss Rose; 3rd, The Common Moss Rose; 4th, The Blush Moss Rose; 5th, The Scarlet Moss Rose; 6th, The Mottled Moss Rose; 7th, The Striped Moss Rose; 8th, The White Moss Rose; 9th, The De Meaux Moss Rose. With these, was also exhibited, a branch, bearing the *Flower of the Moss Rose, and the Common Provence Rose, growing together*; this circumstance, though not very common, is well known to those conversant with the species and varieties of Roses, and is a proof of the error into which writers on the genus Rosa have fallen, in treating as two species those which are certainly the same; the Moss Rose is decidedly only a variety of the Rosa Provincialis, or Provence Rose.

August 17, 1819. Mr. John Dawson, a Corresponding Member of the Society, gardener to Sir Watkin Williams Wynne, at Wynnstay, in Denbighshire, sent a dozen *Fruits*

of the Banana Tree (Musa sapientium) to the Meeting. They were of considerable size, between four and five inches long, and possessed an agreeable, luscious, and acid flavour. The produce from a single plant in a stove, is sufficiently abundant to entitle the Banana, when properly managed, to be considered as an useful fruit for the table. Mr. Dawson's account of his treatment of it is as follows: "About eight years ago, I turned the plant out of a pot into the earth in the pit of the stove; it was then about six feet high, with a single stem. In each succeeding year it has produced a bunch of fruit; but in the present, having attained greater strength, it yielded two bunches; the first was ripe in May, and the other in August, having about four dozen fruits on each bunch. The plant this season was sixteen feet high, and measures three feet round at the bottom."

September 7th, 1819. A letter was read to the Meeting this day, addressed to the Secretary, by Mr. John West, Corresponding Member of the Society, gardener to the Marquis of Northampton, at Castle Ashby, detailing his *Mode of growing Onions* of a large size, for use early in the season, which he has practised successfully for some years. About the end of January he plants in rows, at nine inches apart, the small bulbs of Onions grown in the preceding year; these grow to a large size, and are ripe full two months sooner than Onions grown in the usual methods, and at a season when none others, except the Potatoe Onions, are fit for use. The bulbs selected for this planting should be the smallest which can be picked out; if large, they are apt to run to seed. They should be planted with a dibble,

two inches deep, and the ground should be well trodden about them. Mr. West states, that he has obtained Onions, by this method, early in the summer, which have measured fifteen inches in circumference. The plan here directed is the same as is recommended by the President in a Paper* communicated to the Society in April 1809.

At the same Meeting. Some *Spanish Onions* were exhibited by Mr. Samuel Rintoul, gardener to the Earl of Liverpool, at Walmer Castle.. These Onions were raised from the seed of a Spanish Onion, grown at Walmer Castle; the seed was sown in the open ground, in August, and the Onions were transplanted from the seed bed in the beginning of the April following, and then treated as recommended by Mr. Warre,† in his description of the cultivation of Onions in Portugal. Three of these specimens weighed together five pounds: the largest weighed one pound nine ounces, and many others from the bed upwards of one pound each. From these and other specimens received by the Society in the season, it seems certain, that the climate and soil of England are capable of producing a supply of this useful root, in as great perfection as the more southern parts of Europe.

September 7th, 1819. Mr. James Mills, late gardener to Isaac Elton, Esq. of Stapleton House, near Bristol, exhibited to the Society *a Plan of a Hot Wall*, designed by himself, the chief advantages of which, as suggested by Mr. Mills, are, 1st, that the heat of the flue can never be con-

* See Horticultural Transactions, Vol. I. page 158.

† See Horticultural Transactions, Vol. III. page 67.

veyed with such strength to the lower part of the wall as to injure the trees, as sometimes happens; 2nd, that the heat supplied by the flue will be equally distributed over the entire substance of the wall. It does not appear that any wall has yet been executed upon this plan, the chief peculiarity of which, is the interposing columns of air (which will receive heat from the flue) between the flues and the external surface of the wall; this is proposed to be effected by forming a hollow space from top to bottom of the wall, between the flue and the exterior surface of the wall: the air in this being heated by the flue, and being contiguous to the whole outer surface of the wall, its heat would probably be equally distributed to every portion of the wall, and consequently not in greater force to the bottom than to the top.

Octorer 9th, 1819. Mr. Stoffels, of Mechlin, a Corresponding Member of the Society, in a letter to the Secretary, read this day, mentions a discovery which he had accidentally made of an *advantageous mode of training Peach trees*. In the spring of 1818, he was obliged to strengthen a wall, against which Peach trees were growing, by building against it a buttress, three feet and a half wide, with an inclination of about fifty-one degrees. His gardener trained some branches of a Peach tree upon this inclined plane, and it was soon perceptible that vegetation was more vigorous there, than where the tree was trained to the perpendicular wall, for in a short time the quantity of young wood was so great on the buttress, that room could not be found to train it all in, whilst on the upright wall there was hardly a sufficient number of shoots to fill the vacant spaces; and the fruit upon

the branches trained to the buttress was one-fourth larger than that on the rest of the tree.

November 16, 1819. Seeds of *Vicia sylvatica*, sent by the Rev. George Swayne, of Dyrham, near Bath, were distributed. Mr. Swayne has cultivated this plant, which is found wild in his neighbourhood, as a creeper, training it up against a wall, mixed with the Corchorus Japonicus; when the early beauty of the Corchorus has gone off, the unsightly appearance of its branches during the remainder of the year is concealed by the delicate leaves and the beautiful striped flowers of the Vicia, which does not grow up sufficiently high in the first part of the spring to interfere with the splendid flowers of the Corchorus. The seeds of the Vicia may be sown in the place where they are to remain, any time before the beginning of March; the plants will then soon spring up, but will not blossom in the first summer.

At the same Meeting. Mr. Swayne also sent some *Apples*, the produce of a seedling tree, about twenty years old, having somewhat the character of a Pearmain, from the seed of an Apple of which description it was raised. The tree is a great bearer, very healthy, and quite free from canker. The circumstance which renders it worthy of notice is its habit of growth; the centre branches are sufficiently erect, but the side ones are so pendant, as to place it amongst the trees with weeping branches, and to entitle it to the name of the *Weeping Apple:* its blossoms, also, are remarkable in having a bright crimson tinge. These

two qualities will recommend it as an ornamental addition to lawns and pleasure grounds.

December 7, 1819. The produce of some *Orange and Lemon trees*, growing against a wall in the open ground, in the garden of James Yates, Esq.* of Salcombe, near Kingsbridge in Devonshire, were exhibited. These fruits, though not selected samples, were very fine. Mr. Yates gives the following account of the trees. His garden is on the brink of a precipice, about fifty feet above the level of the sea, and the temperature of the climate is such, that the thermometer rarely rises above 76°, and seldom is under 30°, having been only once last year below the freezing point. The trees are about fifteen years old; they are trained to a stone wall, with a southern exposure, twelve feet high, to the top of which they reach; they spread sideways about fourteen feet, and are still increasing. The soil in which they grow is a tolerably rich deep loam. About three years ago, (and neither before nor since,) they were manured with a compost of rotten leaves, earth, and decayed stable dung. For several years after they began to bear, they had no covering whatever in the winter; but now, more as a security against an extremely severe winter than from any necessity, they are protected by some glass frames. The quantity of fruit they bear, before they are thinned, is very great; from fifteen to twenty dozen are usually allowed to remain on each tree; these ripen well, are of excellent quality, and grow to considerable size. The Lemons espe-

* See Horticultural Transactions, Vol. I. page 243.

cially yield more abundant and better juice than foreign fruit.

At the same Meeting. Mr. MARK ROBSON, a Corresponding Member of the Society, Gardener to RALPH RIDDELL, Esq. of Felton in Northumberland, communicated the following *Receipt for a wash for the destruction of insects on fruit trees.* Upon fourteen pounds of tobacco paper, pour eight gallons of soft water, let it stand twenty-four hours, and then strain it off; in order to get the whole strength out of the paper, pour four more gallons of water on the same, and strain it off, after it has stood the same number of hours. To the whole twelve gallons, add half a pound of flower of sulphur, and two pounds of soft soap, melted in a little hot water, mixing the whole well together. With this liquid wash the trees well, throwing it on with a syringe before the sap begins to ascend. If tobacco paper cannot be obtained, take one pound and a half of roll tobacco, boil it in three gallons of water, until all the strength be drawn from it, then add as much water to the liquor as will make up the twelve gallons.

JANUARY 18, 1820. JOHN BRADDICK, Esq. exhibited some *Grapes*, which, though shrivelled, were remarkably rich, and free from all bad taste or appearance of mouldiness or decay. The perfect condition in which they were, is thus accounted for by Mr. BRADDICK. The Grapes had been ripened under glass, but without fire heat, and had remained on the Vines until they were gathered for exhibition to the Society. In the autumn Mr. BRADDICK covers the floors of his vinery about three inches thick with coal ashes; this

effectually prevents any damp from rising, to mildew or injure the fruit, and by this means alone they keep on the trees remarkably well, and acquire a richness of flavour which is very unusual in Grapes in the state in which these appeared.

XXI. *On the Cultivation of the* Filbert, *describing the Method of Pruning, as practised in the Grounds near Maidstone in Kent. In a Letter to the Secretary. By the Rev.* William Williamson, A.M. *Corresponding Member of the Society.*

Read March 21, 1820.

Sir,

The county of Kent, and more particularly the district round Maidstone, and extending to the borders of Sussex, having been long celebrated for the production of large crops of Filberts, and of a much larger size than are commonly grown, a description of the method of cultivation and pruning cannot be unacceptable to the Members of the Horticulrural Society, more especially, as I have reason to believe it is but little, if at all, known in other parts of England.

In order to make myself more clearly understood, I shall treat the subject under the following divisions: *Soil*, *Raising the Plants*, *Manure*, and *Pruning*; which last forms the great distinction between the cultivation in Kent and in other counties.

Soil. The first consideration in making a plantation, is to select a proper soil; for if that be not congenial to the constitution of the plants, we cannot expect any great success. The soil in which the most experienced cultivators suppose the Filbert to flourish best, is a *hazle loam* of some depth, with *a dry sub-soil.* If the sub-soil be too retentive of moisture, the trees are apt to run too much to wood, without

throwing out those short twigs upon which the firuit is generally produced. That part of Kent, where the Filbert is chiefly cultivated, is a loam upon a dry sandy rock. As a general rule, that soil which is proper for the growth of Hops, is thought to be also congenial to the Filbert.

Raising the Plants. There are four methods of raising the plants; by suckers, layers, grafting, and sowing the Nuts. Each is practised according to the peculiar object of the cultivator. The method adopted in the district above mentioned, is by suckers; they come sooner into bearing, and make stronger plants than either layers or grafts. They are taken from the parent plant generally in the autumn, and planted in nursery beds, (being first shortened to ten or twelve inches,) where they remain three or four years. They are slightly pruned every year, in order to form strong lateral shoots, the number of which varies from four to six. The most free growing plants are obtained by sowing the Nuts; but they are so long in coming to a productive state, and are so much inclined to degenerate into inferior varieties, that this method is never resorted to in making a permanent plantation. The plants raised by laying and grafting are of more humble growth, and therefore better adapted for small gardens where the economy of space is an object of importance.

Manure. The Filbert requires a considerable quantity of manure; the grounds in Kent are dressed every year, or at least once in two years. Every kind of manure is beneficial; but old woollen rags are found to produce the greatest effect. If Kent had not been a Hop county, these would scarcely have been thought of; but as the same soil is congenial both

to the Filbert and the Hop, it would soon occur to the intelligent cultivator, that probably woollen rags might be as beneficial to the Filbert as they are known to be to the Hop.

Pruning. The method of pruning the Filbert being so different from that of every other tree, as far as I know, and being not generally practised beyond the county of Kent, a particular explanation of it will be necessary.

Before any one can possibly prune a tree with propriety, it is necessary that he perfectly understand the mode of its fructification. The fruit of the Vine is produced only upon shoots of the preceding year; Cherries are grown chiefly upon short spurs emitted from the sides of the larger branches; if, therefore, the last year's shoots of the Vine, or the spurs of the Cherry tree, are destroyed, there can be no fruit. Now, in some respects, the Filbert is similar in its fructification to both these trees; the bearing branches being *always* those of the preceding year, similar to the Vine, and these branches, if the tree be properly pruned, might with great propriety be called spurs, allowing for the difference between the Filbert and the Cherry; these short twigs or spurs are not more than a few inches long, every bud of which, in a good year, produces fruit. The great object of the following method of pruning is to cause the trees to throw out these spurs in great abundance; and when they are got to a proper bearing state, more than sufficient will be produced.

But though it is the usual practice to plant the suckers in nursery beds, I would advise every one to plant them where they are to remain, whether they are intended for a garden or a larger plantation: and after being suffered to grow without restraint for three or four years, to cut them down

within a few inches of the ground. From the remaining part, if the trees are well rooted in the soil, five or six strong shoots will be produced. Whichever method is practised, the subsequent treatment of the trees will be exactly the same.

In the second year after cutting down, these shoots are shortened; generally one-third is taken off. If very weak, I would advise that the trees be quite cut down a second time, as in the previous spring: but it would be much better not to cut them down until the trees give evident tokens of their being able to produce shoots of sufficient strength. When they are thus shortened, that they may appear regular, let a small hoop be placed within the branches, to which the shoots are to be fastened at equal distances; by this practice, two considerable advantages will be gained; the trees will grow more regular, and the middle will be kept hollow, so as to admit the influence of the sun and air, but this, in a large plantation, would be almost impossible, nor indeed is it necessary, though in private gardens, where regularity and neatness are almost essential, it ought to be practised.

In the third year, a shoot will spring from each bud; these must be suffered to grow till the following autumn, or fourth year, when they are to be cut off nearly close to the original stem, and the leading shoot of the last year shortened two-thirds.

In the fifth year several small shoots will arise from the base of the side branches which were cut off the preceding year; these are produced from small buds, and would not have been emitted, had not the branch on which they are situated been shortened, the whole nourishment being carried

to the upper part of the branch. It is from these shoots that fruit is to be expected. These productive shoots will in a few years become very numerous, and many of them must be taken off, particularly the strongest, in order to encourage the production of the smaller ones; for those of the former year become so exhausted, that they generally decay: but whether decayed or not, they are always cut out by the pruner, and a fresh supply must therefore be provided, to produce the fruit in the succeeding year.

The leading shoot is every year to be shortened two-thirds, or more should the tree be weak, and the whole height of the branches must not be suffered to exceed six feet. Every shoot that is left to produce fruit, should also be tipped, which prevents the tree being exhausted in making wood at the end of the branch.

The Filbert is a monoecious plant, and consequently produces the male and female blossoms separately on the same tree; the slender scarlet filaments which are seen issuing from the end of the buds early in the spring, are the female, or productive blossoms; the barren or male blossoms are formed on long cylindrical catkins, which fall off as soon as they have performed their office; in pruning, care must be taken to leave a due supply of these to fructify the female blossoms, or our previous trouble will be entirely useless; this may be done without difficulty, for they are perfectly visible at the time of the pruning.

The method of pruning above detailed might in a few words be called a system of spurring, by which bearing shoots are produced, which otherwise would have had no existence.

It frequently happens that a strong shoot springs from the

root; and should any of the first year's or leading branches be decayed, or become unproductive of bearing wood, it will be advisable to cut that entirely away, and suffer the new shoot to supply its place, which afterwards is to be treated in the same manner as is recommended for the others.

Old trees are easily induced to bear in this manner, by selecting a sufficient number of the main branches, and then cutting the side shoots off nearly close, excepting any should be so situated as not to interfere with the others, and there should be no main branch directed to that particular part. It will however be two or three years before the full effect will be produced.

But though this method of cultivation has long been celebrated, yet it does not appear to me so particularly successful as to deserve the encomiums which have been bestowed upon it; for though thirty hundred weight per acre have been grown in particular grounds, and in particular years, yet twenty hundred weight is considered a large crop, and rather more than half that quantity may be called a more usual one; and even then, the crop totally fails three years out of five; so that the annual average quantity cannot be reckoned at more than five hundred weight per acre.

When I reflected upon the reason of the failure happening so often as three years out of five, it occurred to me, that possibly it might arise from the excessive productiveness of the other two, the whole nourishment of the trees being expended in the production of the fruit; and that, consequently, they might be unable properly to mature the blossom for the following year. We know that Peach and Nectarine trees may be so pruned, as to force them to bear a superabundant

quantity of fruit in some one year: but we find that a regular crop in succession is thereby prevented, and that too, for several years. In order to ensure fruit every year, I have usually left a large proportion of those shoots, which from their strength, I suspected would not be so productive of blossom buds, as the shorter ones; leaving them more in a state of nature than is commonly done; not pruning them so closely, as to weaken the trees by excessive bearing, nor leaving them so entirely to their natural growth, as to cause their annual productiveness to be destroyed by a superfluity of wood. These shoots, in the spring of the year, I have usually shortened to a blossom bud, for the reason before given.

The great art of pruning is to produce the greatest quantity of fruit, without injury to the crop of the succeeding year, which, in my opinion, is not done by the Kentish method. But by observing the rule which I have laid down, though the trees do not *perhaps* bear so great a weight in any one year, as by the method before detailed; yet the crops in the whole certainly are not less: with this great advantage both to the public and private grower, that a moderate but regular crop is ensured in every successive year. I think that by this plan the average weight in the whole will be greater. The year 1819 was a very productive one, and I grew two hundred weight of Filberts (weighed when gathered) upon fifty-seven trees, the greater part of which were not above six years old, (reckoning from the time of their being cut down), and growing upon three hundred and sixty square yards of ground; which is after the rate of twenty-seven hundred weight per acre, and upon part of the ground ten more trees are now planted, which, if they had come to a bearing state, would have increased the

quantity to more than is considered as an extraordinary crop, besides having grown upon the older trees a moderate but regular quantity for several years preceding. I am the more confirmed in my opinion that the failure is caused by excessive bearing, by observing, that there is very little blossom on my trees this spring, which has not been the case in former years.

In order to strengthen the tree as much as possible, care should be taken to eradicate the suckers from the root, which is effected by exposing the roots to a moderate distance from the stem, to the frosts of winter. The excavation in the spring is filled with manure.

As Filberts are several years in coming to perfection, it is usual to plant Hops, Standard Apples, and Cherries, among them, and when they come to a bearing state, the Hops are destroyed, and the fruit trees suffered to remain. The ground is then planted with Gooseberries, Currants, &c. and an under crop of vegetables is likewise frequently obtained. If this were not practised, the crop of Filberts alone, except in particular years, would not defray the expense. The distance at which Filberts are planted, must depend upon their being mixed with other fruit.

I have been the more minute in my description, both that I might be clearly understood, and also that the directions might be generally useful; and I trust it will not be less acceptable on that account; for though the minutiæ can only be practised in private gardens, yet the principle can be extended to any plantation, however large.

I remain,

Your obedient humble servant,

WILLIAM WILLIAMSON.

Westbere, March 17th, 1820.

XXII. *On the Culture of the* African Gladioli, *and other* Cape Bulbs, *in the open Borders. In a* Letter *to the Secretary. By the Hon. and Rev.* William Herbert, *D. C. L. F. H. S. &c.*

Read April 4, 1820.

Dear Sir,

I send for distribution, amongst such Members of the Society as may be disposed to cultivate the *African Gladioli* in the open border, a large parcel of the seed of Gladiolus blandus. I believe there were some mules between G. angustus and G. blandus amongst the bulbs from which the seed was gathered, and I think I applied the dust of other Gladioli to some of the plants, without marking them, which may afford further varieties. The seeds should be sown immediately in the American border, and well watered: and whenever the weather is dry, the young plants should be plentifully watered, to promote their growth. At the beginning of October, or as soon as the leaves wither, the young bulbs should be taken up and dried: they may be replanted again at any time, placing them about eight inches under ground, to prevent the frost reaching them, for very severe frosts will destroy them, if they are near the surface. The seedlings, if well encouraged, may be expected to flower next year. The blossom of the old bulbs is abundant in June, July, August or September, according to the time at which the bulbs are set. If the peat is heavy and rich, it should be mixed with sand, to prevent its cankering them, or causing them to rot, by the retention of too much wet in the winter.

Gladiolus tristis is decidedly the hardiest species; its leaves resist the severest frosts; and even the long continuance of frost and snow, last winter, has only turned the leaves a little yellow, and cut their points. It flowers in the open ground in May, June, and July, and I have left bulbs of it, unmoved, in the border four or five years. I have flowered G. hirsutus in September, in the open ground, but it requires a more sandy soil, and its bulbs become cankered in my peat, which is very rich with rotten wood.

The best way of treating Gladioli, which are to be flowered in pots (at least the free growing sorts) is, whenever the bulbs are potted, to plunge the pots about eight inches under ground in the peat border, and raise them nearer the surface in the spring, as soon as the very severe frosts of winter are over: or if placed at once nearer the surface in a bed, to spread moss, leaves,* or saw-dust, over the bed. Many of the other Cape Ensatæ succeed well with the same treatment, without any care, especially Watsonia Meriana, Ixia flexuosa, and Trichonema roseum. Ixia longiflora is very hardy, and flowers finely in the border, but prefers a more sandy compost.

I am persuaded that the African Gladioli will become great favorites with florists, when their beauty in the open border, the facility of their culture, and the endless variety which may be produced from seed by blending the several species, are fully known, nor will they be found to yield in beauty to the Tulip and Ranunculus.

Some years ago, when I lived at Mitcham, in Surrey, I

* The leaves of the horse chestnut, which are large and not easily shifted by the wind, form an excellent protection for beds of tender bulbs in the winter.

cultivated many Cape bulbs, and even the fibrous rooted Aristeas, with great success, in borders formed of the same compost, which I used for Hyacinths. The borders were covered at night, and in frosty weather, with double mats upon hooped sticks, which were entirely removed in April. The compost was made of rotten cow-dung, decayed leaves, and fine sand. In this Gladiolus cardinalis and Watsonia rosea produced tall branching stems, bearing from seventy to eighty flowers, and Aristea spiralis as well as Aristea melaleuca (which I believe has not flowered at all elsewhere in England) produced nine or ten strong flower stems from the same root. Babiana rubro-cyanea bore nineteen or twenty stems in one small store pot of offsets, planted in the same compost. But the bulbs, especially the more delicate sorts, were, as well as the Hyacinths, liable to suffer from the canker, to which the quantity of rotten wood in the peat I am forced to use at Spofforth, also gives rise. Where this disease is found troublesome, the best mode of guarding against it is to set the bulbs in a layer of pure sand, which will prevent their coming into contact with the compost, which never injures the fibres, but often attacks the bulb, especially in wet weather.

Yours very truly,

WILLIAM HERBERT.

Spofforth,
March 27, 1820.

XXIII. *On the most economical Method of employing* Fuel *in heating the Flues of Forcing Houses. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read May 2, 1820.

In cultivating the Pine Apple without the aid of any other artificial heat than that derived from the flues, I have endeavoured to ascertain by what means a high and regular temperature can be best maintained with the least consumption of fuel, and expense of attendance: and I have succeeded so well, by the following method, that I think I can with confidence recommend it.

I caused coal, in a state of dust, and of a kind which does not unite when heated, to be incorporated, when very wet, with about one-third of its bulk of clay, or pond mud; and this composition, after being firmly beaten together upon a broad flat stone, or board, to the requisite degree of thickness, was cut into square pieces of the size and form of half a common brick. A fire grate of the usual form, but of large size (about two feet square) was prepared to receive it, it being expedient that the fire place should contain a large mass of materials of slow combustion: and as the coal dust, in the wet state, above mentioned, does not readily ignite, a sufficient quantity of wood to make a moderately strong fire was previously introduced. The masses of clay and coal dust were then put in by means of a small iron plate with a long handle, and no other material has subsequently been found necessary.

The quantity of coal dust consumed during the coldest weather of the last winter was between seventy and eighty pounds weight in every twenty-four hours; and I consider the aggregate expense to have been about seven-pence a day, the price of the coal dust delivered being ten shillings per ton, and the value of the burnt earth, as manure, being fully equal to the expense of the preparation. Newcastle coals would consume much more slowly, and, in an equally quick draft, would probably admit the mixture of a larger proportion of earth. It is scarcely necessary to add, that the foregoing practice will be found most advantageous, where the price of coals is highest.

The fire in my hot-house, in the most severe weather of the last winter, was constantly made up for the night before five o'clock in the evening, and it was never again visited till seven o'clock the next morning, when it was always found in a state to afford fully sufficient heat to the house, which is forty feet long by twelve wide, and heated by a single fire. But it sometimes happened, after a windy night, that the structure of the masses of clay and coal had been wholly destroyed; and in such case, when the weather was very severe, it was found expedient to introduce a small quantity of faggot wood, or decayed pea sticks, between the ignited mass and the fuel put on in the morning

It will probably, at first view, be thought that the clay or pond mud, in the case above stated, operated beneficially in no other way than by preventing the too rapid combustion of the coal; but I believe that it executes a much more important office. It is well known in countries where wood is chiefly used as fuel, that a mixture of dry and green wood

affords much more light and heat during combustion, than an equal bulk of dry wood; and I was long acquainted with the circumstance before I was in any degree able to conjecture the cause of it; but I have subsequently attributed the increased production of heat and light by the intermixture of green and dry wood to the decomposition of water, the oxygen of which readily combines with charcoal in a red heat, whilst the hydrogen being disengaged, burns when it comes into contact with the atmospheric air: and, upon subjecting the experiment to the inspection of Sir HUMPHRY DAVY and Mr. PEPYS, they both agreed in attributing the increased strength and brightness of the fire to the decomposition of the water, which exhaled from the green wood.

The mixture of coal dust and clay being always placed upon the fire in a very wet state, necessarily discharges a large quantity of water in the state of steam; part of which condenses in the cooler parts of the flues; where it is probably absorbed in considerable quantity by the bricks, and exhaled into the house; for I have often found the sides of the flues to feel damp. My hot-house, therefore, though apparently a dry stove, is not really such: and possibly the exhalation of moisture from the flues may be the cause why my pine plants have thriven so much better in very high temperature, than such plants are said to have usually done in those forcing houses which are properly called dry stoves.

XXIV. *Physiological Observations upon the Effects of* partial Decortication, *or* Ringing *the Stems or Branches of Fruit Trees. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read June 6th, 1820.

It has not, I think, been sufficiently explained by what means the obstruction, or prevention, of the passage of the fluids of trees through their bark operates in occasioning an increased production of blossom, and a more rapid growth, and more early maturity, of the fruit; the gardener is, in consequence, in many cases, unable to foresee whether he is likely to obtain benefit, or to sustain injury, from the operation: and he is wholly without the means of knowing how to adapt his mode of operating, with any degree of precision, to the object which he has in view. I therefore address the following observations, under the impression that the hypothesis, which I have advanced in different papers in the *Philosophical Transactions*, will afford a satisfactory explanation of the cause of all the abovementioned effects.

According to that hypothesis, the true sap of trees is wholly generated in their leaves, from which it descends through their bark to the extremities of their roots, depositing in its course the matter which is successively added to the tree; whilst whatever portion of such sap is not thus expended sinks into the alburnum, and joins the ascending current, to which it communicates powers, not possessed by the re-

cently absorbed fluid. When the course of the descending current is intercepted, that necessarily stagnates, and accumulates above the decorticated space; whence it is repulsed, and carried upwards, to be expended in an increased production of blossoms, and of fruit: and, consistently with these conclusions, I have found that part of the alburnum, which is situated above the decorticated space, to exceed in specific gravity, very considerably, that which lies below it. The repulsion of the descending fluid therefore accounts, I conceive satisfactorily, for the increased produce of blossoms, and more rapid growth of the fruit upon the decorticated branch: but there are other causes which operate in promoting its more early maturity. The part of the branch which is below the decorticated space is ill supplied with nutriment, and ceases almost to grow; it in consequence operates less actively in impelling the ascending current of sap, which must also be impeded in its progress through the decorticated space. The parts which are above it must therefore be less abundantly supplied with moisture; and drought, in such cases, always operates very powerfully in accelerating maturity. When the branch is small, or the space from which the bark has been taken off is considerable, it almost always operates in excess; a morbid state of early maturity is induced, and the fruit is worthless.

If this view of the effects of partial *decortication*, or *ringing*, be a just one, it follows that much of the success of the operation must be dependent upon the selection of proper seasons, and upon the mode of performing it being well adapted to the object of the operator. If that be the production of blossoms, or the means of making the blossoms

set more freely, the ring of bark should be taken off early in the summer preceding the period at which blossoms are required: but if the enlargement, and more early maturity of the fruit be the object, the operation should be delayed till the bark will readily part from the alburnum in the spring. The breadth of the decorticated space, as Mr. SABINE has justly observed, must be adapted to the size of the branch;* but I have never witnessed any except injurious effects, whenever the experiment has been made upon very small, or very young branches; for such become debilitated, and sickly, long before the fruit can acquire a proper state of maturity. I have found a tight ligature, applied in the preceding summer, in such cases to answer, in a great measure, all the purposes of ringing, with far less injurious consequences to the tree; and if such were applied to the stems, or principal branches of Cherry trees, which are to be forced very early in the following year, I believe the blossoms would be found to set more freely, and the fruit to attain an early maturity. I have also succeeded in preserving, to a great extent, the health of a ringed branch by instantly covering the exposed surface of the alburnum with a tight bandage of coarse thread coated with bees wax, if the branch were small; or of fine packthread, if it were large; so as wholly to fill the space from which the bark had been taken. By such means the desiccation and consequent death of the external surface of the alburnum have been prevented; and I, consequently, think it not improbable that the operation might be performed with

* See page 124, of this volume.

advantage upon the Cherry tree, and some other fruit trees, to which it has hitherto been found destructive. I have tried, with the most ample success, in the present spring, the application of such a bandage upon a ringed branch of a Fig tree; and the evidence I have obtained of its mode of operation has not been confined to a recent period, for I applied such a bandage in the first experiment I ever made upon a plant, and at the distance (I have particular reasons for knowing) of precisely half a century from the present time; when I was a school boy of ten years old.

I am not friendly to the process of ringing, in whatever manner it may be performed; and I think it never should be adopted, unless in cases where blossoms cannot be otherwise obtained, or where, in very early forcing, the value of a single crop of fruit exceeds the value of the tree. For it is a process which promotes the expenditure, whilst it diminishes the creation, of the vital fluid of the tree, which must also suffer in all subsequent periods, from the organic injuries it sustains.

XXV. *On the Culture of* Hyacinths. *In a Letter to the Secretary. By the Hon. and. Rev.* William Herbert. *D. C. L. F. H. S. &c.*

Read July 4, 1820.

Dear Sir,

The Dutch mode of treating *Hyacinths* has been fully detailed in a work by St. Simon, entitled *Des Jacintes*, published at Amsterdam in 1768, in 4to. in which every thing that can be said, and a great deal more than need be said, about a Hyacinth, will be found. Complying with St. Simon's directions as nearly as possible, I produced for several years successively, at my villa in Surrey, where I had the advantage of the vicinity of the fine sand of Shirley common, Hyacinth flowers fully equal, if not superior, to those obtained from the best Dutch bulbs; but since my collection of plants has been removed into this part of Yorkshire, where fine sand can only be obtained by the tedious process of breaking stones and reducing them to powder with an iron hammer, I have been prevented from cultivating them with equal success.

The compost used at Haarlem is rotten cow-dung, rotten leaves, and fine sand. In making this compost the Dutch gardeners prefer the softer leaves of elm, lime, and birch, and reject those of oak, chestnut, walnut, beach, plane, &c. which do not rot so quickly. The cow-dung which they use is also of a peculiar quality, being collected in the winter, when the cattle are stall-fed upon dry food, without any mix-

ture of straw or other litter. The sand is procured in the neighbourhood of Haarlem, where the soil is a deposit of sea-sand upon a compact layer of hard undecayed timber, the remains of an ancient forest which has been overwhelmed by the sea. The purest sand is procured by digging to some depth. St. Simon imagines that this sand has peculiar virtues, in consequence of an admixture of salt and sulphur, but I believe he is mistaken; for, in order to judge of the effects of sulphur, I placed a Hyacinth on a glass full of sea sand, having sprinkled on the surface some fresh sulphur, which I had scraped off Hordle Cliff, in Hampshire, and the bulb refused to vegetate or push any fibres till the sulphur was removed.

The leaves used by the Dutch are laid in a very large heap, in a situation not much exposed to the sun, and not liable to stagnation of water, which is carefully drained from them. When they are decayed and fit for use, the compost is thus made: first, they place a layer of sand, then one of dung, and then one of rotten leaves, each being eight or ten inches thick. These layers are repeated till the heap is six or seven feet high, a layer of dung being uppermost, sprinkled over with a little sand to prevent the too powerful action of the sun upon it. After the heap has lain thus for six months or more it is mixed, and thrown up afresh, in which state it remains some weeks, to settle, before it is carried into the flower beds. This compost retains its qualities about six or seven years, but the Dutch avoid setting Hyacinths in it two years successively; in the alternate years they plant Tulips, Jonquils, Narcissuses, Crocuses, Frittillarias, Lilies, Irises, &c. in the same beds; nor do they venture to set Hyacinths in the com-

post the first season, when the fresh manure might be injurious to them. The choice bulbs are taken up every year, and the soil that lay amongst the fibres is then carefully brought up to the surface. The beds should be deep enough to prevent a possibility of the fibres coming nearly in contact with the natural soil.

I believe that English sea-sand, or that which the London nurserymen obtain from the neighbourhood of Croydon, will suit the cultivation of Hyacinths as well as that of Haarlem. Where the leaves of elm, &c., cannot conveniently be kept distinct, I imagine that other leaves will serve the purpose as well, if they are left a much longer time to rot; and even old tan, if thoroughly decayed and pulverised, may be used instead of leaves, since the Dutch have tried it with success. The difficulty is to obtain in this country cow-dung without straw: it may however be collected in the fields, although being the produce of green food, and dried before it is collected, it will not perhaps have the same virtue as that used by the Dutch; and if it is necessary to use that from the farm yard, it should be taken as free from straw as possible, and from the cow-house door, without any mixture of other dung, which would be prejudicial; and it must be completely decayed before it is used. The mischief occasioned by the fermentation of half rotten straw, and the too great heat of horse-dung, &c., is a contagious decay amongst the bulbs, which will spread throughout the bed: the cause of this decay appears to me to be a fungus, the spawn of which is nurtured in the dung. The Dutch, with all their precautions, are very much troubled by this disease; the only remedy for which is the removal of the distempered bulb, and

the compost that was in contact with it; and the cure of the bulb itself, if the injury has not gone too far, may be effected by amputation of the diseased coats.

The beds should be made about three feet in depth with the compost, consisting of about one-sixth of rotten leaves or tan, two-sixths of pure sand, and three-sixths of rotten cow-dung. The compost should not be trodden down hard; but, the bed being opened, the bulbs may be ranged, and then carefully covered from three to five inches deep, but they should not be dibbled or pressed into the compost. The later sorts may be placed nearer the surface, to make them flower earlier. If the situation is wet in winter, the beds may be raised six inches, or even more, above the level of the soil, to prevent the injury which the bulbs might receive from moisture; but if too much elevated, they will suffer from drought. The Dutch cover their beds with dung or tan in winter, which they frequently put on or take off according to the state of the weather. They like the frost to penetrate to the distance of an inch from the bulb; if it descends deeper, they consider that the blossom will be spoiled, and if it reaches the roots, that they will be destroyed. I have never found the frost injurious to the bulbs, though I used no covering; but the winters are more severe in Holland than in England. The compost will require no additional manure till the expiration of about six years, when it should be mixed with fresh sand and dung, prepared as before.

When the leaves of the Hyacinths begin to wither, the bulbs should, if possible, be pulled out of the bed by the hand, to avoid the danger of cutting them with the spade;

The leaves should be cut off, and each bulb laid on its side, covering it lightly with the compost, about two inches thick: in this state they should be left about a month, (but the tardy sorts are usually left longer, and more lightly covered,) and then taken up in dry weather, and exposed to the open air for some hours, but not to a powerful sun, which would be very injurious to them; they should, after this, be carefully examined, and all the decayed parts removed by a knife, for which purpose it will sometimes be necessary to cut deep. An extravasation of sap or lodgement of moisture within the coats, will cause a local decay, which, if the diseased part be not carefully and entirely cut out, will spread over the whole bulb, and become contagious amongst those which are near it.

The bulbs should be placed in the store room, which ought to be airy, about the end of June; they must not be suffered to touch each other; and should be frequently examined, in order to remove those which may shew fresh symptoms of decay. If few in number, a moveable stage of very open lattice work should be used, which may slide upon castors, and be set in any dry, cool, and airy room. If the stage be large, it should be furnished with many ranges of drawers just deep enough to receive the bulbs, at intervals of about six inches in heighth, or more. When the bulbs are numerous they will require an entire store house; this may be constructed with planks, and consist of two stories, the lowest of which must be raised from the ground upon posts; it should, if possible, be ventilated by long apertures on three sides, the shutter of each aperture being a plank six or seven feet long, and about a foot

wide, made to turn like the laths of a Venetian blind; and when damp westerly winds prevail, the shutters must be nearly, if not entirely, closed. The bulbs in this place should be ranged on tables or stands raised one above the other, with an interval of between two and three feet in heighth between the tiers, to give free access to the air. Before they are planted in the autumn they ought to be again carefully examined, and all decayed parts and withered coats removed.

My own experience enables me to say that any nurseryman in the neighbourhood of London, who will take the trouble of following the directions given in this letter, may produce Hyacinth bulbs, equal, if not superior, to those imported from Holland; though, perhaps, with greater loss from disease, owing to the quality of the dung he may be necessitated to use. I have no doubt but that nurserymen might cultivate Hyacinths, and Cape bulbs alternately, with great success in the compost described, using the precaution of placing white sand round the Cape bulbs, which would otherwise be cankered by the manure, and, when diseased, would become the prey of centipedes and small maggots. Pure sand placed in contact with the Hyacinth bulbs might be a preservative to them also: and if the dung cannot be obtained without a mixture of rotten straw, perhaps a larger proportion of sand may be adviseable. I should not be surprised if watering the compost before it is used, with salt water or brine, should prove of some use, supposing a fungus to be one of the causes of mischief; for after trying many other things in vain, I found salt to be the only remedy for the tanner's fungus, which is so troublesome in tan beds, and in the pots of earth in the stove. Those who still use tan, which I have not admitted

for the last six years into my stoves, will perhaps find it useful, on that account, to wet their tan with salt water before they use it.

I am,

dear Sir,

Yours very truly,

WILLIAM HERBERT.

Spofforth,
June 27th, 1820.

XXVI. *Account of the* Rosa Banksiæ, *or* Lady Banks's Rose. *By* Joseph Sabine, *Esq. F. R. S. &c. Secretary. With Notices of the proper Method of Treating it, so as to make it flower in perfection. By Mr.* Isaac Oldaker, *F. H. S.*

Read August 15, 1820

The successful management of the *Rosa Banksiæ*, at Spring Grove, having been the means of more speedily attracting that attention to the plant, which the fragrance of its blossoms and the beauty of its foliage will at all times hereafter command, I have drawn up a general description of the Rose, and such facts relating to the plant itself, as will, I trust, be deemed not unworthy the attention of the Society; and to these I have added the particulars of its treatment, as communicated to me by Mr. Oldaker.

The flowers are produced in small umbels, each of three, four, six, and frequently even of twelve or more flowers, at the extremity of the small shoots, which proceed from the sides of the branches of the preceding year; their peduncles are about an inch and a half long, smooth and slender, and so weak that the flower hangs downwards, when it is expanded. The germen (tube of the calyx) is semi-globose, the sepals (leaves of the calyx) are short, nearly triangular, and, when open, recurved. The flower, when fully blown, has much the appearance, and is nearly of the size, of a double cherry blossom; it is very double, and well expanded, consisting of a great number of small white petals, with even,

regular margins, the inner ones being rather crumpled; the stamina and stiles are not destroyed by the doubleness of the flower, but they are somewhat concealed amongst the petals, giving, by means of their colour, a shade of pink to the centre of each blossom. The scent of the flowers is most agreeable, being exactly like that of the sweetest violet.

The branches are free from aculei; they require support, and when trained against a wall, extend forty feet and more. The surculi, or root shoots, are of extraordinary vigour, growing, in the season, from twelve to fifteen feet in length. The leaves are numerous, of a shining dark green, consisting generally of five (sometimes three) leaflets, which are broadly-lanceolate, simply serrated, and smooth; they remain on the plant till the middle of January, and, in mild winters, till March, so that it has almost the character of an evergreen, besides which, it grows all the winter, except in frosty weather. In March the flower-buds shew themselves, and at that time, the whole plant is in a vigorous and rapidly growing state. The flowers expand in April, coming out in succession, through the month of May, and in late seasons continue to be produced to the middle of June.

As figures and accounts of the Rosa Banksiæ have been given both in the *Botanical Magazine* and *Botanical Register*, as well as in REDOUTE"s splendid work on Roses, now publishing at Paris, I shall refer,* for more detailed descriptions of it, to those works.

The first imported plant was sent by Mr. KERR from China, to the Royal Gardens at Kew, in 1807; and on the

* Botanical Magazine, 1954. Botanical Register, 397. Redouté's Roses, vol. 2. page 43.

publication of the second edition of the *Hortus Kewensis** it received its name, in compliment to the excellent Lady of Sir Joseph Banks.† This circumstance having caused the plant to be a favourite at Spring Grove, its cultivation became a subject of more particular attention in the garden there; the experiments tried with it were successful, and thus its name has happily been the means of converting what seemed to be an insignificant green-house plant, into a hardy and splendid creeping shrub.

The Rosa Banksiæ, soon after its introduction, must have produced some flowers, for it is stated in the *Hortus Kewensis* (the volume in which it is noticed having been published in 1811), that its time of flowering is June and July; this account is founded on a recorded fact; but the circumstance was probably accidental, since the time was not its natural season, and I have never heard of any other instance of its flowering until it first blossomed at Spring Grove.‡ It was usually treated as a green-house plant, and kept in

* Hortus Kewensis, second edition, vol. iii. 258.

† M. Thory, who furnishes the descriptions which accompany the figures of *Redouté's Roses*, has in his observations on the Rosa Banksiæ given an instance of his want of knowledge of the situation and history of persons of eminence in England, which will probably excite a smile in all who read this note. He states that "Ce Rosier a été dédié à Lady Bancks, épouse de l'Honorable M. Bancks, l'un des savants de l'expédition du Capitaine Cook." (Les Roses par Redoute', volume ii. p. 44.)

‡ M. Boursault succeeded in making it flower under glass, at Paris, in 1819; he obtained a plant from England in the preceding year, and turned it out of its pot into a border of heath mould, in his conservatory, where it grew to the length of forty feet, and produced a great number of flowers. See Redoute''s *Roses*, above referred to.

pots, in which state it always looked unhealthy, and was, in appearance, a small weak shrub.

The following are the observations and notes of Mr. Oldaker, relative to the management of the Rose.

"In the spring of 1813 two plants were turned out into the open ground at Spring Grove, one at the west end of the Pine-stove, the other at the west end of the Peach-house; the following winter being severe, the plant at the end of the Pine-stove was killed by the frost, but it was replaced the following March, and from that time both the plants grew very vigorously, making shoots from twelve to fifteen feet in length each summer. In two years they had covered the sides of both houses with a thick mass of wood and leaves, and the stronger shoots had extended several feet beyond the ends of the houses. In 1818 the branches, which had extended beyond the end of the Pine-stove, were nailed against an adjoining wall, in the manner of a fruit-tree, and in the spring following, the part so nailed was completely covered with flowers, whilst the flower-buds of the part against the house, which remained untrained, was completely destroyed by the wind and cold weather."

"Sir Joseph and Lady Banks were so much pleased with the beauty of the plant, which had been thus successfully treated, that they directed the other plant, which grew next the Peach-house, to be trained, in a similar manner, to a contiguous south wall. For this purpose, I conducted the stem of part of the plant nine feet under the ground, (in order to pass the door of the Peach-House,) to the foot of the wall, cutting away the remainder of the branches, which grew against the Peach-house, to give full strength

to what I trained against the wall. This wall being fourteen feet high, and seventeen feet long, was completely covered by the branches in the summer of 1819, some of them extending full forty feet; this vigorous growth and the subsequent production of blossoms, far exceeded all my expectations. In the spring of this year, the plant broke at every eye of the preceding year's wood, each shoot produced at its extremity, an umbel of flowers, which began to open in April, and the whole wall was completely covered with blossoms until the middle of June.

"Before I discovered the proper method of treating it, this Rose, from its early and vigorous growth, had always suffered from the cold winds and frosts to which this country is subject in March and April; this injury, however, I have now ascertained, may be prevented by the following treatment: it should be planted in a rich sandy loam, against a wall exposed to a south or west aspect; its branches must be nailed close to the wall, in the manner usually practised in training Morello Cherries, and when the wall is covered to the extent proposed, all the strong shoots must be cut out as they appear; this will give strength to the remaining branches intended to produce flowers in the succeeding spring, which they will do most freely.

"I also discovered, this season, a method of making small plants of the Rosa Banksiæ blow well in pots, after the whole blossom of the trees against the wall had ceased, and as this is likely to be successful, it is without doubt worthy of notice.

"In the beginning of February, I put several small plants of the Rose in pots, on the back bed, in the house in which

I forced flowers for Lady BANKS, cutting the plants down to within a few buds of their roots. The heat of the house was from fifty-four to sixty degrees of FAHRENHEIT's thermometer. The plants made strong shoots, and by the middle of March, their young branches were about eighteen inches long: at this time they were taken out of the flower-house and placed under a Melon-frame, the glasses of which were taken off in the day, and only put on at night, to exclude frosts: no heat being applied to them in this situation, the change of climate operated so as not only to check their growth, but to put them artificially into a state of rest, as in the winter; the young wood having been previously well ripened with the effect of the summer warmth, they broke out into blossom by the end of July, and most of them were completely covered with flowers.

XXVII. *On the Culture of the* Guernsey Lily, *and other Bulbs of the Genera* Nerine, Coburgia, *and* Brunsvigia, *heretofore united under* Amaryllis. *In a Letter to the Secretary. By the Hon. and Rev.* William Herbert, *F. H. S. &c.*

Read, April 4th, 1820.

Dear Sir,

I find no difficulty in the culture of the *Guernsey Lily*, concerning which the Society has desired some information. It is decidedly a native of the Cape, from whence I have received the bulbs dug up in a wild state; and indeed the whole genus Nerine, to which it belongs, appears to be confined to South Africa. I entirely disbelieve its having been found in Japan or China, except in gardens, or naturalized by accident in a congenial climate. It is very likely to have been confounded by Thunberg with the Asiatic Amaryllis radiata, which I suppose to belong to the genus Lycoris, and which may very probably grow at Nagasaki in Japan, where Thunberg states that he found the Guernsey Lily growing wild.* The only attention which the Guernsey Lily requires here, is to give it sufficient air while the leaves are growing, that they may be strong and dark coloured; to protect the leaves from frost, keeping the pots near the light, if under glass; to give a moderate and regular supply of water, and to leave the bulbs nearly dry, from the time

* See Flora Japonica, page 131.

the leaves decay, that is, about Midsummer, at latest, till the end of August, when the flower buds should appear. If the bulbs are not left dry early in the summer, the autumnal shoot will be delayed, till the season becomes too cold for the proper growth of the flowers or leaves, and the natural course and vigour of the plant will be interrupted, after which it will require at least a year to repair the injury it will have received. Whenever the sprouting of the bulb is tardy, it should be assisted by placing it, for a short time, in a warmer situation. If the stigma does not expand so as to become, after a few days, trifid, it is a sign that the temperature is rather too low, to suit the plant, and the leaves will probably not push freely without more heat. I have obtained seed from the Guernsey Lily; not, however, by placing the bulbs (as Mr. KNIGHT recommends*) in a stove to ripen it, but by procuring the blossom early, in an airy situation. The confined air of the stove probably prevented Mr. KNIGHT's from ripening their seed.

A good yellow loam, without any manure, will suit Guernsey Lilies very well: but I think they will thrive in any wholesome compost, which does not tend to canker their bulbs: they should be planted partly above ground, for the wet earth round their necks will prevent their flowering or thriving, and will even sometimes destroy them. The old coats about the neck of the bulb, which hold water like a sponge, should be occasionally pulled off.

The prevailing notion that Guernsey Lilies would not flower a second time in this country, has arisen from improper treatment, the bulbs having been either placed without protection out of doors, where the frost will infallibly destroy

* See Horticultural Transactions, vol. iii. page 399.

their leaves, or in a stove, or too far from the light in a green house, where they have grown weakly. It is at the time when the leaves are growing, that a very free admission of air is most necessary, and unless their growth be promoted early in the autumn, this cannot be easily given with a sufficiently high temperature.

By compelling the Gladioli and Ixias, and some of the Oxalises, to delay their shoot (which would naturally be made in the autumn) till the spring, their habit is inverted, and they are accommodated to our climate out of doors; but I have not yet been able to succeed in so inverting the habits of the Guernsey Lily, though I still suspect that it might be done, by placing the bulbs at a considerable depth in a dry sunny bank of loam. This might be tried by plunging the pots, when the bulbs were dry, a foot deep in sand, out of doors, in such a situation, covering the bed with saw-dust, to exclude the frost: but I fear, with this treatment, the flower-buds would be apt to perish in the winter.

I do not think the cultivation of these bulbs upon a large scale, as it is practised in Guernsey, will answer in Great Britain, unless, perhaps, in the south-west of England, on account of the expense attending the protection of the bulbs from frost; they will probably be obtained from Guernsey at a lower price, than the London nurserymen could ever raise them. A frame glazed with oiled paper would probably be the best substitute for glass, and might be a sufficient protection, with the super-addition of mats in very severe weather: the pots, in that case, should be plunged in saw-dust, to preserve them from accidental drought, and the water, especially in still and cloudy weather, should not be given with a rose, which would wet the necks of the bulbs. They should be

kept as hot as possible in the summer, when the leaves are withered, giving them, at that time, very little or no water. The same treatment suits the whole of that division of the bulbs, formerly confounded with the Amaryllises, which now forms the genus Nerine,* viz. undulata, humilis, flexuosa, venusta, rosea, corusca, and curvifolia. It is to be regretted that no other species of Nerine is cultivated at Guernsey. The plant known to us under the name of the Guernsey Lily,† is one of the varieties of Nerine venusta,‡ but it is neither so beautiful, nor so free to bloom, as some other species of the same genus. Nerine curvifolia,§ the largest species with fine scarlet flowers and broad glaucous leaves, scarcely ever fails to flower; and Nerine rosea‖ is very superior in beauty, and flowers more freely than the Guernsey variety of venusta. The small sort of Nerine venusta, flowers freely, three or four bulbs being placed together in a small pot.

The smallest species, N. undulata,¶ will breed with any of the other species. I have many strong mules from it impregnated by N. curvifolia, which are much larger than the mother plant, with much broader and more glaucous leaves.

The original substance of this letter was written in the autumn of 1818, and was delayed, as you will remember, for the purpose of sending with it the blossom of one of those mules. The buds were chilled, and failed at the end of October, and the same cause, namely their having vegetated too late in 1818, prevented their shewing bloom at all last year.

* Bot. Mag. 2124.
‡ Bot. Mag. 1090.
‖ Bot. Mag. 2124.
† Bot. Mag. 294.
§ Bot. Mag. 725.
¶ Bot. Mag. 369.

The same general observations, as to culture, are applicable to almost the whole of the genus Coburgia,* though Coburgia (Amaryllis) Belladonna is hardier, while some of the others, with whose habits we are less acquainted, perhaps require a little more heat to promote their shoot. The leaves of C. Belladonna are not only hardier, but more willing to delay their full growth till spring, and therefore the bulbs thrive in the open ground; but the consequence is, that unless the summer is hot and dry, the flower stem is delayed too late in the autumn, and perishes, and it will then be thrown out of the ground in a half rotten state, at the time when the leaves sprout vigorously in the spring. I have seen this happen four years successively. Last year, in consequence of the great drought which suspended the vegetation of the Belladonnas early, they flowered with me abundantly in a south aspect, but a bulb which was in an eastern border, and watered, did not flower in the autumn, but threw up its dead blossom in the spring. The object, therefore, in managing those bulbs, should be to promote the early growth and early decay of their leaves. There is no such thing really as a spring variety of Belladonna: such a circumstance depends upon accidental causes, or upon favourable situations, in which the bud has been preserved through the winter, instead of perishing, as it generally does, when delayed too late in the autumn. I am certain of this by experience.

Coburgia blanda† is too rare to have been planted out by me, but I find it flowers extremely well if placed in the stove while it is dry; being brought out into the conservatory when in flower, and replaced in the stove to promote

* See Bot. Mag. p. 2113-4. † Amaryllis blanda. Bot. Mag. 1450.

the growth of the leaves, till they are about two thirds grown, and then removed again into a green-house, to remain there till they decay. Similar treatment seems to suit Coburgia Josephinæ* and C. pallida.† I think the same mode will succeed best with the other sorts, viz. Coburgia multiflora,‡ C. radula, and C. ciliaris : but I have not yet had sufficiently satisfactory experience of their culture, to speak confidently ; I believe all of them should be planted in good loam, two thirds of the bulb being under ground; and perhaps with the most delicate sorts, a little sand should be placed in contact with it. Leopoldia reticulata and striatifolia,§ which are two distinct species of a separate genus, approaching to Coburgia in the seed, and to Amaryllis in the flower, require the stove, and will not thrive with much of the bulb above ground. It should be entirely covered with the earth, and the pot should stand in a warm but shady situation, and be plentifully watered. The immediate action of the sun or heated air on the coats of the bulb appears to be injurious to it. Mr. BURCHELL's *Herbarium* furnishes specimens of a beautiful unknown Coburgia, with a fine umbel of flowers, apparently rose-coloured, which are produced while the plant has leaves.

The real Brunsvigias, viz. B. falcata and B. coranica, have a very different habit from those united under the

* Amaryllis Josephinæ. Redouté Lil. 370, — 372. Brunsvigia Josephina β. angustifolia. Bot. Reg. 192, 193.

† Am. pallida. Red. Lil. 470. Am. Belladonna minor. Ker. in Journ. Sc. & A.

‡ Brunsvigia multiflora. Bot. Mag. 1619.

§ Amaryllis reticulata. Bot. Mag. 657. And var. striatifolia. Bot. Mag. 2113, and Bot. Reg. 352. Leopoldia reticulata and striatifolia. Bot. Mag. 2113. p. 5.

name of Coburgia ; their vegetation being, with us, suspended in the winter, and their leaves beginning to sprout in March. Young bulbs of Brunsvigia falcata have lived some years in the open ground with me, close to the east wall of the stove; and I think it will be found, hereafter, to succeed best out of doors in a dry and shady situation in good loam, with sharp sand round the bulb and occasional supplies of water in the summer time. A shady situation, in an airy green-house, under the leaves of Vines, appears to promote its blossom and the ripening of its seeds. I have always found its leaves quickly injured by strong sun and drought. I do not possess B. coranica, but it appears to have exactly the habit as well as the appearance of B. falcata, from which it is not distinguishable by its bulb or leaf: but I believe it flowers more readily.* I keep B. toxicaria in the stove in the winter and in the green-house in the summer, under which treatment its leaves are always growing, but I have not yet flowered it, nor can I say confidently what is the best mode of treating it, nor indeed whether it is really a Brunsvigia or a distinct genus.

The bulbs of Nerine and Coburgia, and indeed almost all bulbs which have a season of rest, should be carefully examined at the commencement of that period. In general, it will be most adviseable to remove all the earth from them, which may be done by careful management, in shaking the ball and pricking it with the point of a knife

* Crinum revolutum, Bot. Mag. p. 2121-5, which is closely allied to the real Brunsvigias, conforms with them in its habits, preferring to be at rest in the winter ; it will not thrive well with the bulb above ground, which if so placed, is almost sure to bleed and decay, and perhaps it might succeed best in a favourable situation out of doors; but it is so scarce at present that I cannot try the experiment.

or stick, without at all injuring the fibres. I do not mean, that it is necessary with the hardiest sorts, such as Nerine undulata, of which there may be many roots in a pot, with their fibres closely matted, or Coburgia Belladonna, to shake the earth entirely from them every year, but when it can be done conveniently the bulbs will be more healthy in consequence. All the dead parts from the neck of the bulb should be pulled off, the dead fibres removed, together with any decayed portion of its base, and its dead integuments should be stripped off, so as to lay bare the first shining coat, and that should be carefully wiped, if it appears clammy or mouldy, which is very often the case. Not unfrequently an extravasation of sap, or a lodgement of wet at the neck of the bulb, will be found to have caused a partial decay of some interior coat, while those without are sound and healthful. After the removal of all that is withered, that secret mischief will become visible, and the sound coats must be cut freely away, for the purpose of removing the internal decay, which would otherwise become fatal. Whenever there is a doubt as to the necessity of removing a coat from a bulb, it should be taken off without hesitation. A short exposure to the air, but not to the sun, will be useful, if the bulbs are either clammy or mouldy. They should be carefully repotted, separating the fibres without straining them, and bringing some of them to the side of the pot, and pouring in the earth (which should be well pulverized and moderately moist, but by no means wet) so as to divide them; for, if they be all squeezed together, or forced into an unnatural posture, they will decay. The bulbs should be left for a while without any water, in a warm

and dry situation, to ripen and prepare their blossom: the earth should have just sufficient moisture to promote the growth of the fibres, and prevent their shrivelling. I believe that a moderately strong loam, or a mixture of light and strong loam, where soil of the proper medium is not easily procured, will be found the best, for all the species of Nerine; for Coburgia, especially C. blanda and C. Beiladonna, as well as Hæmanthus, which requires the same treatment as that recommended for Coburgia blanda, I think a stronger loam desirable, and I consider the use of peat to be dangerous to the bulbs; although they may be found to thrive pretty well in various composts. When the bulbs are repotted, the offsets may be taken from them, and those which are of sufficient strength to flower, may be set apart from the younger stock. Under the treatment recommended for Hæmanthus, I do not include H. puniceus and multiflorus, which perhaps form a distinct genus; nor the bulb which has been sometimes called Hæmanthus toxicarius, which if it be not a Brunsvigia, will be found, as is most probable, to be a genus by itself.

Amaryllis laticoma *Bot. Reg.* 497, is the Nerine lucida *Bot. Mag.* 2124, p. 2, discovered by Burchell beyond the Snowy Mountains in South Africa. It is unquestionably a Nerine, but it has leaves which do not perish in the summer, and it seems more disposed to repose in the winter.

I am,

dear Sir,

Your's very faithfully,

William Herbert.

Spofforth,
March 20, 1820.

XXVIII. *On the Treatment of the Standard* Fig Trees *in the Gardens at Arundel Castle. By Mr.* John Maher, *F. H. S. Gardener to his Grace the Duke of* Norfolk, *at Arundel Castle, Sussex.*

Read, November 3d, 1818.

When the gardens at Arundel Castle were first entrusted to my care, his Grace expressed a wish that I would give particular attention to the *Fig trees*, seven of which were growing there as standards; of these one was the White Marseilles, the others were the Violette or Bourdeaux Fig.* I found the trees overloaded with wood, a considerable portion of which was dead, and the rest bearing a poor and scattered crop of fruit, very little of which ripened, owing no doubt, in some measure, to the unfavourable season. In the following winter I cleared away the exhausted surface earth, to the depth of nine inches, below which I found a solid bed of gravel, clay, chalk, and flint, which I dug out to the depth of two feet, wherever the roots would permit; at the extremities of the roots I went to the depth of four feet, clearing the whole away. I then procured a quantity of good rich loam and street sweepings, and with three parts of the first, and one part of the other, I made the ground good to its former level. In the following spring I thinned out the wood

* Specimens of both these Figs were exhibited at the meeting of the Society, on the 1st of September, 1818, which were not only unusually large, but were admirably ripened, and of delicious flavour.

with a saw, and smoothed the cuts with a sharp knife: the centre branches I cut completely out, and left the side or horizontal branches, which this summer were quite bent down with the weight of leaves and fruit.

This season has certainly been very favourable to the ripening of the fruit, but I flatter myself that the fruit has been improved by the mode in which I treated the trees, for the quantity, richness, and size of the Figs have never, I believe, been exceeded in this county, which is, notwithstanding, famous for the production of this kind of fruit.

I regret that I cannot furnish any particulars, as to the age or history of the trees; but the size of one is very remarkable, it is the Marseilles Fig, from which the specimens which I lately sent to the Society were gathered. The tree measures six feet nine inches in circumference, at two feet above the surface; it there branches into two arms, each of which is three feet six inches in circumference. The extended branches of this tree cover thirty feet in diameter.

XXIX. *A practical Account of the Culture of* Early Melons.

By Mr. Patrick Flanagan, *Corresponding Member of the Horticultural Society, Gardener to Sir* Thomas Hare, *Bart. F. H. S.; at Stow Hall, in Norfolk.*

Read, June, 6th 1820.

The two *Melons* exhibited by me to the Society in the first week in May, were produced by a mode of cultivation which I have successfully adopted for several years. The following details will, I flatter myself, enable other practical gardeners, who may desire to pursue the same plan, to obtain equal success.

I grow my early Melons under three-light frames, which are eleven feet long, by four feet and a half wide, two feet deep at the back, and fourteen inches in front: the lights of these frames are glazed with the best crown glass, well fitted in the laps, and puttied; they are made so perfectly close, that no air can gain admittance into the frames, except when I give it by raising the lights.

Each frame is placed upon the top of a hollow brick pit,* which is four feet deep within side: the lower part (about

* After this Paper was communicated to the Society, I was informed that a plan of a pit on the construction above described, is given in Mr. Macphail's book on the Cultivatiou of the Cucumber (see Macphail *on the Cucumber*, London, 8vo., 1794), but, I understand, for I have not seen the book, that he recommends cross flues under the divisions of every light, so that he has two cross flues under each three-light frame: but my pits are without these.

ten inches) is solid, and is sunk in the earth, the remainder is a flue carried entirely round the pit; the hollow part of the flue is three inches wide in the clear, and the walls of it are formed of four inch work, that is, of bricks laid flat: the inner wall is well bedded with good mortar, and pointed within and without so perfectly, that the steam of the dung which is introduced into the flue cannot penetrate into the inside of the pit; the outer wall of the flue is constructed with open brick work, which admits the steam of dung linings into the flue; the top of the flue is covered with eleven inch tiles, extending over the hollow part, and both the side walls and this are also rendered, by means of mortar, impervious to steam; the frame is placed on the external wall of the flue, and stands exactly flush with the outer face of the brick work. The bottoms of the pits are kept dry by means of drains.

Previous to working a frame, the hollow inside of the pit, which is nine feet two inches long, by two feet eight inches wide, and four feet deep, is filled with loose tiles, or brick rubbish, to within eighteen inches of the top of the flue; above this is placed a layer, about a foot thick, of short prepared dung nearly cold, and then another layer of six inches of very rotten dung; both of these are well and closely trodden, so as to prevent their sinking afterwards, and over the whole, level with the top of the flue, is placed a floor of coal ashes, laid quite smooth and half an inch thick, which prevents any worms, which may be in the dung, getting through into the mould above it while the frame is in work.

The compost used by me in growing early Melons is made of three parts of well prepared rich loam, and one part

of very rotten dung ; these are well mixed together and laid in a ridge to meliorate, six weeks or two months before it is wanted for use.

As I always grow Cucumbers both on dung and in brick pits through the winter, the expense and trouble of a seed bed for Melons is saved, by using one of the Cucumber frames, which answers equally as well for that purpose. I sow the early Melon seeds the first week in January, and place the seed pots as near the glass of the frame as I can. In eight or nine days after sowing, when the seed-leaves are fully expanded, I put my Melon plants into small pots of five inches diameter, three plants into a pot, and when they have made the second or third rough leaf, I stop them. These plants, if they have been duly attended to, will have filled the pots with roots, and be fit for turning out into the Melon frame by the sixth or seventh of February.

I generally line my pits a week or ten days, before the plants are fit to put out, always using for my linings quite fresh dung, which I prefer not only because the expense and trouble of preparing the dung in the usual mode is saved, but because it loses much of its strength in the preparation ; all danger from the steam of it may be avoided by proper attention in the gardener or his assistant. For the same reason, when I renew my linings, or add to them, I also invariably employ fresh dung.

When the heat from my first linings comes up, I treat the frame exactly in the same way, as I do after the plants are ridged out in it, not only in giving air but in covering it, and watering the flues, as hereafter described.

In introducing the compost into the frames, I first spread

a slight covering of it evenly over the surface of the ashes, and then place one good barrowful in a heap under the centre of each light; when the heaps become warm, I form the hills in the middle of each, bringing their tops to within seven or eight inches of the glass, the mould of the hills being moderately pressed together with the hand, so that the roots of the plants may work freely through it.

Whenever the roots of the plants appear through the hills I add a covering about an inch thick of the compost, and this application of fresh compost becomes necessary soon after the Melons are ridged out, and continues so from time to time, until the beginning of March, when the surface of the pit, up to the inner edge of the flue, will be almost covered with the additional mould. The flues also will be ultimately covered in part with mould, but it should not be filled up fully against the frame, but ought to slope downwards, towards the bottom of it, on every side.

The due management of forcing the early Melons consists in the attention which is paid to the regulation of the heat, the admission of air, and the covering of the frames.

Each three-light frame is covered at night in the following manner: a good clean large mat is laid lengthways over the lights, which covers the glass, and keeps the whole clean; then follows a regular layer of hay, thick in proportion to the heat in the linings, and the temperature of the night, and over the hay, for each light, is placed a single mat, (three mats to each frame,) which is properly and securely fastened by nails, taking care that no part of it hangs over the sides or ends of the frame.

The coverings are usually fastened down about sun-set,

and I invariably visit the frames between seven and eight o'clock, by which time the heat within them will have somewhat increased. If I find the heat too high, I admit air in proportion to its strength, and between nine and ten o'clock I arrange the lights finally for the night, leaving them more or less open, as may be necessary, for the due regulation of the heat; I consider 80 degrees about the proper temperature to be preserved, as nearly as possible, in the early part of the night.

The frames are uncovered in the morning as soon as it is light, if the weather is not very severe; but if there is sharp frost, the covering ought to remain on a little later. I like to find the heat in the morning, within the frame, three or four degrees above eighty, I have known it in very hard weather as low as 68, but it very seldom happens that it is so much reduced.

At nine or ten o'clock in the morning I water the tops of the flues within the frames with a rose water-pot, this produces a steam which is very beneficial to the plants. After the watering, the lights are shut dowr for about half an hour, and when the heat has risen to above 83 degrees, I gave air, increasing or diminishing its admission according to the changes of the weather during the day. The heat of the frames ought not to exceed 85 degrees, nor be lower than 70 degrees. I have found by experience that to bring early Melons in perfection a higher temperature is required than what is necessary for early Cucumbers.

When the flues are watered in the morning, no water is at that time given to the plants; but once or twice a week, or oftener, if necessary, during February, bottom waterings

are given to the hills in the course of the day, but the leaves of the plants are not then wetted. As the power of the sun increases, after the end of February, the waterings are gradually increased; and I also then give water about twice a week, tolerably freely all over the leaves, with a rose, this is usually done on fine bright mornings.

The Melon plants, after being ridged out, soon make runners; these I stop at the third or fourth joint, which causes them to throw out fresh ones, which are usually more productive of fertile flowers, and on them I set my first crop of fruit. I am careful to keep the plants regularly thinned from weak and barren shoots, and from the oldest leaves, when they are too thick.

During the whole period of forcing, the heat under the frames is well kept up by occasional renewals of the linings.

About the middle of March, but sometimes not till the end of the month, the first fruits which have set are become nearly as large as pullets eggs; these I reduce to nine in in each frame, that is, three to a light, and one only to each plant. After this, as the fruit will swell rapidly, fresh compost, if necessary, should be added, and attention be paid to thinning the barren runners and old leaves of the plants, as before directed. When the Melons have arrived at their full size I leave off watering altogether, except that I give a little round the edge of the bed under the frame, to keep alive the roots that run on the top of the flue.

I generally have two or three crops from the same plants. The first crop ripens about the end of April; when that is full grown, before it ripens, I set my second crop, keeping one fruit, as before, to each plant, and as soon as the first

first crop is cut, I give heavy waterings, and get up a fresh heat at the same time; which, imparting fresh vigour to the plants, the new crop grows rapidly and ripens about the latter end of May. When a third crop is required, it is managed in a similar manner.

XXX. *On a new Method of training* Gooseberry Bushes. *By Mr.* Stephen Jeeves, *F. H. S. Gardener to the Lord* Dacre, *at the Hoo, near Welwyn, in Hertfordshire.*

Read August 15, 1820.

The plan of *training Gooseberry bushes*, which I have some time adopted in the garden under my charge, is attended with many advantages; and as it is, I believe, but little known, for I am not aware of its being practised any where else, I have been induced to submit the following account of it to the Horticultural Society.

The object of the operations which I am about to detail is, to lead the branches, at first, in an upright direction, and ultimately to train them on a trellis, in the manner of a berceau or arbour walk. For this purpose, two rows of young Gooseberry bushes should be planted, three feet apart from each other in the row; the interval between the rows must be five feet and a half, and the strongest growing kinds should be used, because their branches will more readily attain the length required.

The branches, when finally arranged, should be about nine inches apart; the plants being at the distance of three feet, each one ought consequently to have four branches; but it is adviseable, at first, to train one or two more from each root, in order to supply vacancies caused by injuries or accidents. A sufficient number of stakes, about five feet high, being fixed in the ground in the same line with the

plants, single branches must be trained to each stake, and when they have grown to the tops of these, the trellis should be formed and fixed; this may be made of such materials as are most convenient, either of common poles, framed wood, or iron; the height from the ground to the centre of the arch should be full seven feet, to allow persons to walk with ease under it. When the trellis is fixed, the stakes may be removed, and the branches must be tied to the frame-work at even distances from each other, and trained in direct lines upwards, until they ultimately meet at the top. It will be about six years from the time of planting, before the whole trellis is well covered.

The management of the plants thus treated is very simple; in the spring and summer, the side shoots must be pinched off at a little distance from their origin, so as to keep the branches clear of each other; and at the pruning season, the shoots may be all cut in, so as to form spurs close to the main stems. A good leading shoot must be kept at the end of each branch, until it has attained the proper length, and this must be shortened in the winter down to the first strong bud. When a branch has failed, from any cause, a new one must be led up from the bottom, to supply its place. As the fruit produced will be most abundant, it must be thinned in the proper season.

The crop when ripe has a very beautiful appearance, every Gooseberry being exposed to the view of persons walking under the trellis: this circumstance, and the facility with which the fruit may be gathered, are alone sufficient to recommend the adoption of the plan; besides, there is a great advantage in the berries being kept at all

times perfectly clean and free from the dirt occasioned by the splashing of rain, which always happens when the branches are near the ground: and I am satisfied that a more abundant crop is produced on plants thus trained than on those of equal age managed in the ordinary way. The facility with which the ground can be dug and manure applied is also additional cause of recommendation of the plan.

If a larger produce of Gooseberries is required than one line of trellis will supply, a second and a third may be formed, and the intervals between them may be cropped with any garden vegetable, for these spaces will not be trampled upon; as, in the performance of any of the operations, it is not necessary for the gardener to go on the outside of the frame to work.

The effect to the eye, when the crop is ripe, is much the best when the same kinds of Gooseberries are planted opposite to each other in the rows, so that both sides and the top of the arch at the same place may bear similar fruit.

Though I have not used this method of training for Currants, yet I conceive it might be applied to them with equal advantage.

XXXI. *Further Particulars of the* Downton Strawberry. *In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read, September 5th, 1820.

My dear Sir,

I have addressed to you, some runners of the Strawberry, to which the Horticultural Society, in their *Transactions*,* have done me the honour to attach the name of my residence; and as different varieties of Strawberry succeed best under different modes of culture, I think a few observations upon the habits of the *Downton Strawberry* may not be useless. The plants of this variety grow with very great luxuriance, afford a profusion of runners, and more abundant branches upon the parent roots, than any other Strawberry with which I am acquainted. I have sent a plant, which was a runner just two years ago, and which produced the fruit you lately received from me; and that will point out its habits in these respects, better than any words I can supply, and also the position of its strong erect fruit-stalks. I scarcely need add, that the plants ought to be placed at considerable distances from each other. I have planted them in rows two feet wide, and the plants at nine inches from each other in the rows; in this way they have borne most profusely; but they have also borne very abundantly where they have been much crowded, owing to the advan-

* See volume iii. p. 396.

tageous circumstance of their blossoms being raised wholly above the foliage. The fruit retains its taste and flavour some days after it has become ripe, and is never more excellent, than when it has acquired a very deep colour, and has begun to shrivel. It is also capable of being kept two or three days after being gathered: and from the reports I have received of the state in which you received it, I conclude that it bears travelling well.

I have given runners of this Strawberry to many of my friends, and I have reason to believe, that it will succeed in every kind of soil; and amongst more than one thousand different varieties, which I have raised, it is by far the most productive of fruit. Of the merits of that fruit, in taste and flavour, as you and several Members of the Society have had opportunities of judging of them, I wish to decline giving an opinion. By dividing the few old plants I possessed in the last spring, I made a considerable plantation, and I have therefore a prospect of supplying the Society with a very large number of runners in the next year, if such should be wanted.

I remain,
my dear Sir,
sincerely yours,
THOMAS ANDREW KNIGHT.

Downton,
Aug. 12, 1820.

Note by the Secretary.

The runners alluded to in this Letter, did not arrive at the House of the Society, until after the Meeting of the 15th of August. When received, they were distributed, pursuant to the general direction of the Council in such cases, to the principal market-gardeners, and nurserymen, connected with the Society, and to such of the Members, as were known to be attentive cultivators of Strawberries. The specimens of fruit received from Mr. KNIGHT, as well as some few which ripened in the garden of the Society, on very weak plants, fully justify the character which has been given of it in the account published in the *Transactions*. There is in its flavour, a peculiar sweetness and richness, quite unlike that of any other Strawberry: and though it cannot be expected, that its qualities should be fully decided on, until it has been produced in considerable quantity, yet what has been this year seen of it, has not in the least diminished the expectation that it will be hereafter considered as of first rate excellence. The Downton Strawberries, which have been exhibited this year to the Society, had less of the Cockscomb form, than those seen last year; they were generally similar to a blunted Pine Strawberry.

XXXII. *Upon the Culture of the* Fig *Tree, in the Stove.* *By* Thomas Andrew Knight, *Esq. F. R. S. &c.* President.

Read July 18, 1820.

In a communication respecting the effects of very high temperature upon certain species of plants, which was addressed by me to the Horticultural Society in the last autumn,* I stated that *Fig trees* of one variety had afforded four successive crops in the same season. The fourth crop, at that period, was only beginning to ripen, and I thought the fruit somewhat inferior in quality to that which had ripened early in the season; but the subsequent portion of it proved most excellent; and some Figs which were gathered upon Christmas day, were thought by myself, and a friend who was with me, much the best we had ever tasted. The same plants have since ripened four more crops, being eight within twelve months; and upon a ringed branch of one year old, and about an inch in diameter, a ninth crop, consisting of sixty Figs, will ripen within the next month. I possess only two plants, each growing in a pot, which contains something less than fourteen square inches of mould, and occupying together a space equal to about sixty-four square feet of the back wall of my Pine stove: from which space the number of Figs that have been gathered within twelve months, has

* See Horticultural Transactions, volume iii. page 461.

been little, if any, less than three hundred: and I see every prospect of a succession of crops till winter. I therefore send the following account of the mode of culture, which has been employed, in the hope that it may prove useful to those who are sufficiently admirers of the Fig to think it deserving a place in the forcing-house.

My trees grow, as I have stated in the communication to which I have above alluded, in exceedingly rich mould, and are most abundantly supplied with water which holds much manure in solution. They consequently shoot with great vigour, notwithstanding the small space to which their roots are confined; and they require some attention to restrain them within the limits assigned to them; but I have found the following mode of treatment perfectly efficient and successful.

Whenever a branch appears to be extending with too much luxuriance, its point, at the tenth or twelfth leaf, is pressed between the finger and thumb, without letting the nails come in contact with the bark, till the soft succulent substance is felt to yield to the pressure. Such branch, in consequence, ceases subsequently to elongate; and the sap is repulsed, to be expended where it is more wanted. A fruit ripens at the base of each leaf, and during the period in which the fruit is ripening, one or more of the lateral buds shoots, and is subsequently subjected to the same treatment, with the same result. When I have suffered such shoots to extend freely to their natural length, I have found that a small part of them only became productive, either in the same, or the ensuing season, though I have seen that their buds obviously contained blossoms. I made

several experiments to obtain fruit in the following spring from other parts of such branches, which were not successful: but I ultimately found that bending these branches, as far as could be done without danger of breaking them, rendered them extremely fruitful; and in the present spring thirteen Figs ripened perfectly upon a branch of this kind, within the space of ten inches. In training, the ends of all the shoots have been made, as far as practicable, to point downwards.

When I made my former communication upon this subject, I supposed that the variety which had succeeded so well in my hot-house, was the large White Fig; the cuttings, from which I raised my plants, having been sent to me as such; and that its size had been somewhat diminished by the confinement of the roots to pots, and the exuberant produce of fruit. I have, however, recently seen a private letter of the late Mr. SPEECHLEY's (the well-known author of Treatises on the Culture of the Pine-Apple and Vine), in which he speaks of a White Fig, that he had found to succeed perfectly in high temperature, but the name of which he does not appear to have known; and I believe that which I am cultivating to be the one he has described. The form of the fruit, in its most perfect state, is an oblate spheroid of nearly two inches in width; but its length often exceeds its breadth, and it then tapers to the point next the stalk.

XXXIII. *Notices of New or Remarkable* Varieties of Fruits, *ripened in the Summer and Autumn of the Year* 1819, *which were exhibited at the Meetings of the Horticultural Society.*

It having appeared to the Council, that it would be desirable to publish in the Transactions, annually, an account of the *New or Remarkable Varieties of Fruits* which are exhibited in each year, at Meetings of the Society; the following statement, respecting those produced in the year 1819, has been drawn up from notes which were made at the periods when the different specimens were shewn, which notes have since been corrected by the persons from whom the fruits were received.

The effect of this practice will be, to point out at one view whatever of novelty or singularity, deserving particular attention, may have been submitted to the Society, and to draw to the different subjects that future consideration which their respective merits may deserve. Another advantage resulting from it will be, that many fruits on which lengthened communications might otherwise have been made, will be sufficiently noticed without occupying too much space in the pages of the Transactions.

It is not proposed to introduce any mention of the exhibitions of fruits whose established excellence has made them sufficiently known, although finely grown or well matured specimens may have been sent to the Society; the novelty of the subjects, the circumstance of their being little known to cultivators, or the expediency of clearing up some doubt-

ful point, respecting any particular kind, will be the only grounds for introduction into these *Notices*. In the present account, some of the articles which ought to be included in it, are necessarily omitted for want of descriptions sufficiently full; the notes which had been made of them, are perfect records in the Minutes of the Society, but not so well adapted for publication as they might have been, had the intention of printing this account been known when they were first made; such, therefore, have been omitted.

In every case where fruits, either new, or not generally established, are transmitted to the Society, and are found to deserve attention, application is made to those persons who have communicated the specimens, for plants or grafts of the kinds, and these are made public either by distribution to the Members present at the Meetings of the Society, or through the Nurserymen who are Fellows thereof; thus giving them publicity with the least possible delay.

It is hoped that this explanation will for the future prevent a practice which has become too common, of Members *individually* making application to persons who have exhibited fruits, &c. to the Society, for plants, cuttings, &c. thereof. It will readily be conceived that such applications, likely, as they are, to become numerous, from the great increase of the Society, must be attended with considerable inconvenience, and have a material effect in defeating the objects of the Institution, by deterring individuals from exhibiting those things which they may think interesting, but which experience must have taught them, will induce so much trouble.

Strawberries.

The Hudson's Bay Strawberry, was exhibited by Mr. Michael Keens of Isleworth. This is a variety not very generally known, of North American origin, as its name implies. It is of the Scarlet kind, but larger than the common Scarlet, and of a lighter colour; the seeds are white, deeply imbedded in the flesh, which is firm, with a rich high flavour. The fruit, at the setting on of the calyx, is lengthened to a neck, and the calyx is reflexed. It is a useful fruit, and better flavoured than the common Scarlet.

Specimens of the *Cockscomb Pine Strawberry* were sent by Mr. Isaac Oldaker, grown by him in the garden of Sir Joseph Banks, at Spring Grove. This is a variety of the Pine Strawberry, the plants of which have a tendency to produce their berries with that extension of the head, which is called a Cockscomb. Mr. Oldaker finds this disposition permanent under his management, and if it can be perpetuated, will make the variety preferable to the common Pine, on account of the increased size and beauty of its fruit.

Raspberries.

Early Red Raspberries were exhibited by Mr. John Wilmot of Isleworth. The plant is a seedling raised by himself. They were similar to the Antwerps, large, and well flavoured. The plant is an abundant bearer, and ripens its fruit many days before any other; a circumstance which renders it particularly deserving of cultivation, especially to those who supply the markets of the metropolis with fruit.

Currants.

Mr. William Morgan, gardener to Henry Browne, Esq. at North Mimms Place, in Hertfordshire, exhibited specimens of a *Seedling White Currant* raised by himself. The berries are very large and grow in unusually long bunches, fully equal to those of the White Dutch, to which it was found superior in sweetness, on a comparison of the two sorts grown under similar circumstances, in the garden of the Society. The footstalks of the fruit are yellowish, and the berries very transparent.

Mr. Morgan has also raised a very good *Seedling Red Currant*, plants of which have been introduced into the garden of the Society; the fruit is very similar to the common Red Currant, but the bunches are uniformly much larger and carry more berries; the plant is also a very good bearer.

From Mr. John Wilmot also was received the fruit of a *Seedling Red Currant*, raised by himself. It is paler than the common Red Currant, grows in large bunches, and with berries considerably above the average size of the old sort, to which it is not inferior in sweetness. This has been named *Wilmot's Pale Red Currant*, to distinguish it.

Gooseberries.

Fruits of *Wilmot's Early Gooseberry* were sent to the Meeting on the 17th of June; they were the produce of a seedling raised by Mr. John Wilmot. The berry is a large smooth oval, stained with a dingy purple, but shewing partially green, as if unripe. The skin is thin, displaying the veins conspicuously. Seeds few, pulp juicy, and of a

tolerably good flavour. It becomes coloured towards the middle of June, and being earlier than any other kind, is usually brought into the market before it is well ripened: but if suffered to remain till perfectly matured, it is a good fruit, and even then precedes all the others.

Mr. Wilmot also, on the 7th of September, exhibited Gooseberries from a seedling which is called *Wilmot's Late Gooseberry;* they were a large oval, of a dark red colour, and perfectly fresh and good, although the bush had not been shaded, and grew in an exposed situation.

Apricots.

John Sudlow, Esq. of Thames Ditton, exhibited at the Meetings in August, specimens of a *Seedling* from the *Moor Park Apricot.* They were large, and so like the fruit of the parent as scarcely to be distinguished from it, either in appearance or flavour. This may, however, be considered an acquisition; for having been raised in England, it is probable that it will be hardier, and better adapted to our climate than its parent, which is originally French; being the same variety which is known in France as the *Abricot Pêche.*

Plums.

Specimens of the *Goliath Plum* were exhibited by Mr. David Anderson, gardener to Lord Montagu at Ditton Park, near Windsor; also from the garden of John Wells, Esq. of Bickley House, near Bromley in Kent. This is the variety which is figured by Mr. Hooker in the *Pomona Londinensis*, under the name of the *Nectarine Plum*, a name given to it as being expressive of its appearance.

The fruit is very large, compressed at each end, with a very slight cleft. The skin is of a deep reddish purple, very pungent to the taste. Flesh pale, firm, and well flavoured, but not rich; it however bakes well, and for culinary purposes is a very useful fruit, but is remarkable for its great size. One of the specimens exhibited by Mr. Wells's gardener weighed four ounces, and measured seven inches and a quarter in circumference.

Mr. James Smith, of Duckenfield Nursery, near Manchester, exhibited specimens of a new *Seedling Plum* raised in his neighbourhood, and named the *Imperial Diadem*. It is a large regular oval, of the character of the Red Magnum Bonum, deeply cleft, of a pale red colour; becoming much darker if suffered to hang on the tree till perfectly ripe. It is of good flavour, and highly perfumed. Its size and beauty will recommend it to notice, though its general application will be for culinary purposes, to which it is admirably adapted.

Mr. William Morgan sent from North Mimms Place, in Hertfordshire, specimens of a new seedling called the *Mimms Plum*, raised by himself from a stone of the Blue Perdigron. The fruit has no resemblance to its parent, it is very large, in shape and size approaching a well grown Magnum Bonum; it is a perfect oval, very little wider at the head than at the end next the stalk, and scarcely at all compressed or indented at either extremity: the cleft is but slightly perceptible. The skin slight reddish purple, varied in parts with bright red, and covered with a fine meal. Flesh with a pale greenish amber tint, tender, very juicy, of a pleasant flavour, but loses considerably in quality if over ripe. Stone rugged, and pointed at both ends. This fruit

is excellent, when baked, having very little acid, and melting perfectly. It bears freely, is hardy, and from its size and good quality is deserving general cultivation both for the table and for culinary purposes.

Peaches.

Roger Wilbraham, Esq. sent from his garden, at Twickenham, specimens of a *Peach* raised from a stone obtained by Peter Kendall, Esq. from South America. The tree was raised by Mr. Braddick, and by him presented to Mr. Wilbraham. The form of the fruit is rather irregular, somewhat pointed, of the middle size. Skin of a dull dark red over all the exposed side, light green on the shaded part, separating easily from the flesh, very downy. Flesh pale yellow, with a radiated circle of fine blood-red next the stone, buttery, with a rich juice of a very delicate though not vinous flavour. Stone perfectly oval, not at all pointed, nor very rugged, stained by the redness of the flesh, and adhering. This is an excellent Peach, and has been called by Mr. Wilbraham *Kendall's Buenos Ayres Peach.*

John Braddick, Esq. exhibited from his garden, at Thames Ditton, specimens of a *Peach* raised from a stone, sent from New York. The fruit is of the middle size, globose, compressed, wider at the head than next the stalk, and very slightly cleft. Skin pale yellow, with irregular and rather pale streaks of red on part of the exposed side. Flesh pale, without any tinge of red, perfectly melting, sweet, and high flavoured. Stone very rugged, separating freely, but with

many fibres attached. This very excellent and beautiful variety has been named *Braddick's New York Peach.*

Thomas Andrew Knight, Esq. sent specimens of a Peach, the produce of a tree raised from a seed of the Little Red Nutmeg Peach, impregnated with the pollen of the Violet Hative Nectarine; the fruit is rarely more than seven inches in circumference, but very handsome and of most superior flavour. It is extremely hardy, having ripened its fruit well in very unfavourable seasons in a high and cold situation, from which circumstance it is proposed to call it the *Mountaineer Peach.* It ripens immediately after the Noblesse.

A seedling Peach was exhibited, raised by John Williams, Esq. of Pitmaston, from a stone of the Petit Mignonne, about six years ago, and has been named the *Yellow Mignonne* from the bright yellow colour of its flesh. This Peach becomes perfectly melting when ripe, and partakes strongly of the peculiar flavour of all yellow fleshed Peaches, but is much superior to the Yellow Alberge.

Nectarines.

White Nectarines were exhibited from the garden of William Stephen Poyntz, Esq. at Cowdray Lodge, near Midhurst. The tree was brought from Brussels by Anthony Viscount Montagu, the father of Mrs. Poyntz, and has thence been called at Cowdray, the *White Brussels Nectarine.* It seems, however, to be a distinct variety from the Common White, or Flanders, differing in the peculiar length of its leaves. The fruit is perfectly white, very beautiful, of exquisite flavour, and much larger than the Flanders. It is singular

that this excellent variety should have remained so long confined to a private garden. A drawing of it, with the name of the *Cowdray White Nectarine*, has been made for the Society's collection.

William Townsend Aiton, Esq., sent from the Royal Gardens at Kew, specimens of a late Nectarine raised there from seed. The fruit is very large, globose, but rather irregular, deeply cleft, and much indented at the end next the stalk. Skin dark purple on the exposed side, and quite green where shaded, much speckled with rough brown, and somewhat streaked and dotted where the dark colour terminates. Flesh greenish, firm, and closely adhering to the stone, round which it is of a deep purple red, rich, and high flavoured. The stone is small in proportion to the size of the fruit, and very rugged. In favourable seasons this will doubtless prove a valuable acquisition, but from its large size it will require a favourable exposure, as it does not ripen before the middle of September. Mr. Aiton considers it as most resembling the old Newington Nectarine; it has been called *Aiton's Seedling Nectarine*.

Melons.

Mr. Isaac Oldaker exhibited a very curious and excellent *Melon*, grown by him in the garden at Spring Grove. He brought the seeds with him to England in 1812, from St. Petersburg, where he had successfully cultivated the fruit; he had received them originally from Persia, where, as he was informed, it is called the *Dampsha Melon*, and is esteemed one of their best sorts. The fruit produced first in the season is nearly cylindrical, and bluntly rounded at both ends: the colour of the surface varies from pale yellowish

green to intense dark olive, and the whole fruit is prominently netted. Flesh bright and deep green near the skin; pale towards the centre, quite melting, and of excellent flavour. This, Mr. OLDAKER states, is the true and original character of the fruit. The later fruits become more pointed at the ends, and lose much of the reticulation on the surface, the dark green of the skin becoming darker. This fruit also possesses the valuable property of keeping until the winter months, if hung up by the stalk or in nets in a dry room.

GRAPES.

Fruit of the *Kishmish Grape* was exhibited by Mr. ISAAC OLDAKER, grown at Spring Grove. This Vine is said to be a native of the island of Kishm, or Kishmish, in the Persian Gulph, and was brought by Mr. OLDAKER from St. Petersburg, in 1812. The largest of the bunches are little more than five inches long, well shouldered, and tapering evenly to the point The berries little larger than those of white Currants, of a greenish tint deepening to pale yellow, and becoming ultimately of an amber hue. They are not very sweet, but are juicy, of a pleasant refreshing flavour, and wholly free from seeds. The Vine is a very free grower, and excellent bearer. The wood is of a pale colour, the leaves rather thick, roundish, and not deeply cut. The figure by Mr. HOOKER will convey a perfect idea of this very pretty Grape.

Mr. ISAAC OLDAKER also exhibited at the two meetings in September, specimens of a *Black Grape*, the produce of a Vine brought from St. Petersburg in 1812. The bunch is

The Muscat Grape.

of the middle size, the berries moderately large, round, thick skinned, loosely set on the bunch, sweet, and high flavoured. The Vine is a free grower, with rather slender wood, of a brown colour, and longer jointed than most other sorts; it is an abundant bearer, sets its fruit freely, and is so hardy, that it will probably be found well suited to the open wall. The leaves are deeply cut, the veins are red, and the foot-stalks are long and red; as the fruit ripens, the leaves become of a purple colour, like those of the Claret Grape. It is proposed to call this the *Petersburg Grape*, as the plant was brought from that city, though Mr. OLDAKER states it to be by no means common there, having only met with one plant of it, which filled a house one hundred and forty feet long, and yielded very large crops. The Grapes closely resemble those which General PLATOFF was accustomed to send annually from the Don, as presents to his friends at St. Petersburg.

PINES.

Specimens of the *Welbeck Seedling Pine* were sent to the Society in August, by Mr. JOHN WILMOT, and by Mr. ISAAC OLDAKER. This is a small fruit, generally broader at the head than at the base; of a pale yellow, or sulphur colour, with very flat pips. The flesh is white and tender, rich in flavour, with less acidity than is found in most other Pines. Correct information of the origin of this variety, beyond what its name affords, has not been obtained. It is not of recent date, but is now noticed because it is not mentioned in the works on gardening usually referred to, and it has too much excellence to be passed over without commendation, both for its beauty and quality.

Mr. John Wilmot also sent, on the 3d of August, a very handsome blood-red Pine, grown at Isleworth by himself. The fruit is square set, or equal in bulk at both ends. Pips of moderate size, much like those of a good Enville. Colour dark, but rather a brick red than a blood colour. The flesh is white and opaque; the leaves are large, of a changeable hue, being partially of a vivid green, varied with dull purple and red, and thickly covered with cinereous meal. The specimen now described weighed three pounds, and was considered the finest of the kind that has been produced. The peculiar handsome appearance of this variety, whilst it continues a novelty, will cause it to be partially cultivated; but its merit, in point of flavour, is so much below that of most others, that it will only be preserved in the stove as a curiosity.

Pears.

Mr. Hugh Ronalds exhibited specimens of the *Green Pear of Yair*. This is a Scotch variety of very great excellence, but is little known or cultivated in England, though mentioned by Forsyth and others. It ripens in the beginning of September; is of the size of a large Swan's Egg; skin green, slightly russetted; flesh inclining to yellow, perfectly melting, and sweet, with a very small core, almost free from grit. It bears well as a standard.

John Williams, Esq. sent from Pitmaston, specimens of a seedling Pear which he had raised from the seed of the Swan's Egg, impregnated with the pollen of the Gansell's Bergamotte. It is an excellent variety, partaking of the character of both parents. Mr. Williams has named it the *St. John's Swan's Egg*. It is very hardy, and bears well on

a standard: the fruit should be gathered about the end of September, for if allowed to remain longer on the tree it is apt to become mealy.

Roger Wilbraham, Esq. sent a fine specimen of the *Napoleon Pear*, the produce of a graft received by the Society from Dr. Van Mons, of Brussels. The form is pyramidal, but irregular, something like a Colmar. The skin is green, becoming pale yellow when fully ripe. Flesh white, a little inclined to pale dull yellow, of pleasant consistence, melting and juicy, of excellent flavour, and much sweetness. The core is small, almost free from grit, and the seeds, which are few and small, are inserted near the head. This Pear is interesting, as being the first of the new Flemish varieties produced in this country with an authenticated name. So much confusion existed in the manner in which both the specimens of the fruits and the grafts were sent over by Dr. Van Mons, that it will be a work of time and considerable attention to affix the original names to the produce of the trees now abundant in the gardens of those Members of the Society, who have attended to the growth of these valuable fruits, which the industry of the Flemish gardeners has recently acquired. The greater part, if not all of them, are now in this country, and it will be the endeavour of the Society to disseminate them as rapidly as possible. The description which is given in page 406 of the second volume of the *Transactions*, of a Pear received from Dr. Van Mons with this name, in 1816, proves how inaccurately the fruits were named which were occasionally received; the Pear there described is certainly another variety.

Apples.

Mr. Hugh Ronalds sent specimens of the *Early Julien Apple*, a very excellent early variety, ripening in the beginning of August. It is of the middle size, of an irregular globose form, with numerous ribs, or angles on the sides, which become quite prominent round the eye; skin a uniform pale yellow. Flesh approaching to yellow, firm and crisp, with a pleasant brisk juice, having much the highest flavour of any of the very early Apples. Mr. Ronalds received the tree from Scotland.

Mr. John Wilmot, sent specimens of the *Gravenstein Apple*, the produce of a tree imported from Holland. This is esteemed the best Apple in Germany and the Low Countries, and is well entitled to the high reputation it has acquired. It is about the size of the Ribston Pippin, and not very unlike it in form. The skin is a pale green, with dotted stripes of red on the exposed side. Flesh of a greenish yellow, crisp, with a rich and high flavoured juice. It ripens in the autumn, but will keep well till April, and may fairly be considered a rival to our Ribston Pippin.

Mr. Hugh Ronalds exhibited specimens, at the end of September, of a small dessert Apple of great excellence, called *Brookes's Apple*. It is shaped like a Pearmain, but is a little more pointed at the eye, being almost conical. Skin green, covered with scarlet on the exposed side, and slightly russetted. Flesh yellow, crisp, very sweet and high flavoured. In eating in the autumn, but will keep till late in the spring. The kind is well known in Shropshire, where it is much esteemed.

Henry Stoe, Esq. exhibited specimens of an Apple, cultivated by him at Hammersmith, and called the *Wise Apple*, from its flowering so very late in the season as to escape the spring frosts ; it consequently is a certain bearer. It is of the middle size, conical, skin yellow, striped with red. The tree is very ornamental in its growth, and retains its leaves till they are taken off by the frost.

John Sudlow, Esq. sent from his garden, at Thames Ditton, specimens of the Fall Pippin, the produce of a graft obtained from America. It is small, being about two inches in diameter each way : eye large, in a wide shallow cavity, surrounded by regular folds or plaits ; stalk long, inserted in an even cavity, of moderate depth ; skin yellow, partially tinged with green, which is more visible round the stalk and eye : the whole sprinkled with minute brown spots : flesh, inclining to yellow, crisp, very juicy, with a rich pleasant acidity. It ripens in November. It is not the Fall Pippin described in Coxe's work on American Fruits, the one there mentioned is the kind of which grafts were distributed by the Society in March, 1819, which were sent to England by Mr. Cobbett. The Apple now noticed having, however, been some time known here by that appellation, which seems to be applied by the Americans to several that ripen in the autumnal season, will be best distinguished, if called *Sudlow's Fall Pippin*.

Mr. Charles Brooker, of Alfriston, near Lewes, sent a large Apple from a tree in his garden ; it weighed twenty-three ounces and three-quarters. The fruit in general is very large, though the particular specimen was the largest of any that have been gathered. Mr. Brooker procured the tree

from Mr. CAMERON, a nurseryman at Uckfield, in Sussex, who cultivated the variety, with the name of *Shepherd's Apple*, under the supposition that it is a seedling, raised some years ago by a person named SHEPHERD, in the neighbourhood of Uckfield. It resembles, however, so closely the *Reinette blanche d'Espagne*, of which specimens, of nearly equal size, have several times been received from Paris by the Society, as to cause a doubt of the fact of SHEPHERD having raised it. Whatever it may be, it is a most valuable variety, on account of its beauty, size, and keeping quality, for it frequently remains sound till the next season; it is excellent as a baking Apple. For these reasons, it highly deserves a more extended cultivation, especially as it generally bears well. Until the fact of its origin is decidedly cleared up, it will be proper to call it the *Alfriston Apple*.

The Rev. Sir JOHN THOROTON sent to the second Meeting in March, 1820, specimens of a seedling Golden Pippin, raised about eleven years ago in his garden, at Screveton, in Nottinghamshire, where the original tree now is. It is a little larger than the Old Golden Pippin, with a yellowish skin, a good deal russetted. The flesh is yellow, more tender than the Old Golden Pippin, and little, if at all, inferior to it in flavour. Plants of this very superior variety, which it is proposed to call the *Screveton Golden Pippin*, have been subsequently presented by Sir JOHN THOROTON to the Garden of the Society.

Mr. HASLER CAPRON, of Midhurst, in Sussex, exhibited at the Meeting in March, and afterwards in May, 1820, specimens of an Apple, gathered from the tree in January, having endured, without protection, the severity of the

winter. It is of the middle size, of an oval form, with the eye considerably depressed. Stalk short, deeply inserted; skin, yellow, with a mixture of green, but nearly covered with rough russetty warts; flesh yellowish, crisp, not juicy, but sweet, and high flavoured. This is a valuable variety, on account of its extreme hardiness, and is a pleasant table fruit. It is known in the neighbourhood of Midhurst under the name of the *Knobby Russet*.

The Rev. William Thomas Bree, of Allsley, near Coventry, exhibited at the last Meeting in May, 1820, specimens of an Apple, called the *Hanwell Souring*, a remarkably good keeper. It is of the middle size, conical, very angular on the sides; eye deeply sunk, in a contracted cavity; stalk short, very deeply inserted in a wide, even basin; skin green, with a blush of dull red where exposed, profusely spotted with minute brown spots, and a little russetted round the stalk; flesh, white, very crisp, with a rich acid juice. It is scarcely in perfection till the late season at which it was exhibited, and then possesses more acidity than any Apple which keeps to so late a period.

XXXIV. *Description of an improved* Forcing Pit. *In a Letter to the Secretary. By Mr.* John West, *Corresponding Member of the Society, Gardener to the Marquis of* Northampton, *at Castle Ashby, in Northamptonshire.*

Read, September 7, 1819.

Sir,

I herewith transmit for the inspection of the Members of the Horticultural Society the ground plan, back elevation, and sections of a *Forcing Pit*, lately erected under my direction at this place, which I hope will meet their approbation. I have, in the last nine years, so fully proved the utility of a four-light pit on this plan that the Marquis of Northampton has caused a new one, with five-lights, to be built on the same principle: this latter I now propose to describe.

The neatness and cleanly appearance obtained by the removal from sight of the dung used in the forcing, is no slight circumstance in favour of the improved forcing pit; but the power of regulating the heat to a great nicety, and the equal application of it round the whole body of the earth, are so advantageous, that I can safely recommend the plan for the forcing of Asparagus and early vegetables, for Strawberries, and for the most delicate kinds of Cucumbers.

The chamber within which the dung is placed, is three feet and a half deep, being about eighteen inches below the sur-

face line; the walls which surround it are nine-inch brick work; both on the front and at the back of the chamber are two openings, about two feet six inches square each, with moveable doors, through which the dung is introduced; the doors fit at bottom into grooves, and are fastened by a wooden pin and staple at top. In front of the doors is a small area, sunk in the ground, surrounded by a curb of wood, by which the introduction or removal of the dung is facilitated. Along the centre of the chamber is a bar, which serves as a guide for packing the dung; and across the top, at intervals of twelve inches, are placed, on their edges, cast iron bars two inches wide and three quarters of an inch thick, to support a layer of small wood, bushes, and leaves, over which is laid the soil for the plants, as represented in the sections. Just below the level of the bars, all round the chamber, are holes passing in a sloping direction through part of the wall into a cavity in the upper part of the wall at the back, front, and both ends of the pit. In order to form this cavity or flue, the wall above the chamber is carried up, externally, with single bricks laid flat, and internally, with single bricks laid on edge, the cavity is consequently two inches wide; for the purpose of strengthening it, the sides are occasionally tied together by bricks passing through from side to side. The top of the cavity, and of the interior part of the wall which rises at the back and front to the level at which the earth is meant to stand, is covered with tiles, over the joints of which are laid slips of slate bedded in mortar, this effectually prevents the steam of the dung escaping: the edges of the tiles which cover the cavity are let well into the external wall, to make the work tight and firm. In the exterior part

of the back wall are holes with plugs, to let out the steam and heat at discretion.

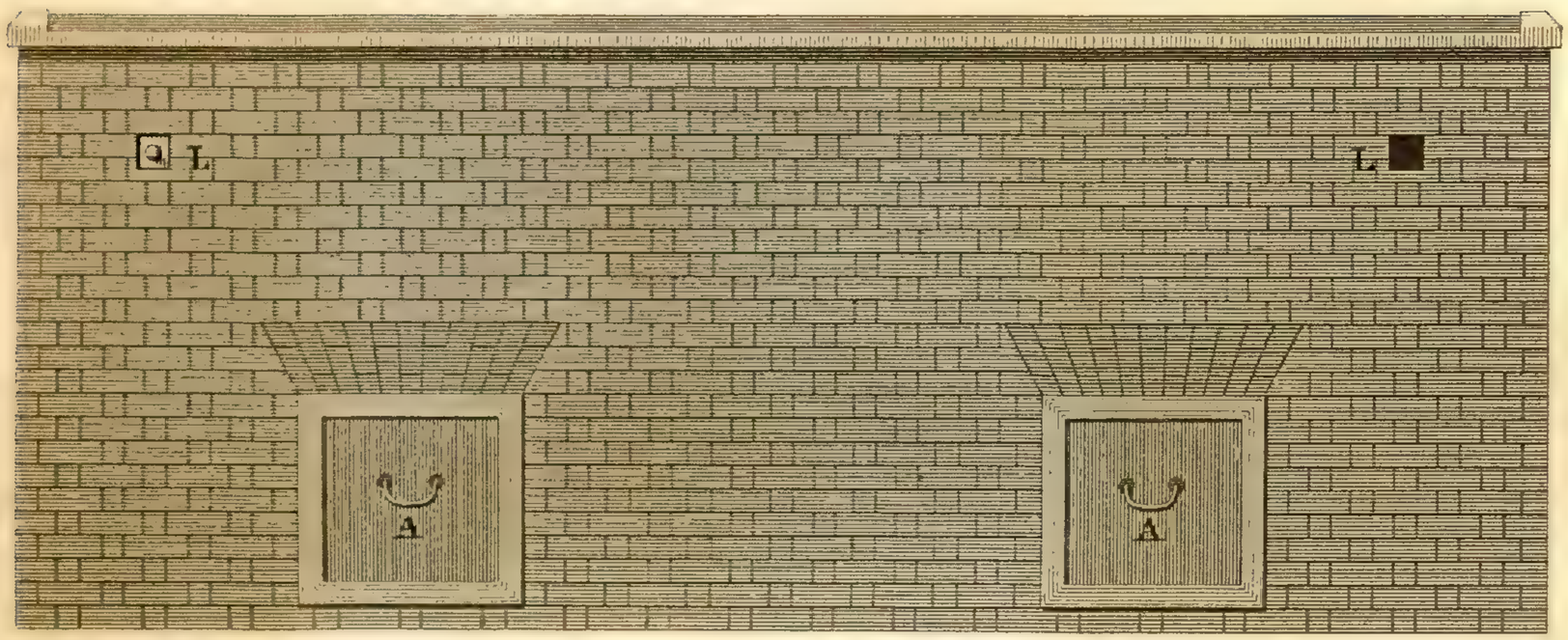
The exterior of the wall supports the frame for the lights, and is carried all round, about a foot above the height at which the flue terminates, the flue being as much lower at the front as the slope of the glass and mould make necessary.

One half of the chamber is filled longitudinally with dung at the commencement of forcing, and if the doors are kept shut, this will afford sufficient heat from twelve to eighteen days, according to the quality of the dung. As the heat declines, the other half of the chamber is filled, and the temperature is kept up by additions to the top of the dung, on either or both sides, as it settles. When the united heat of the two sides ceases to be sufficient, the side first filled must be cleared out; the old being mixed with some fresh dung, must be replaced, and by thus successively adding and turning, the heat will be well kept up. As the season advances, I have found the dung, which by that time has become short, give sufficient warmth when mixed with leaves, and answering very well for melons through the summer.

At the commencement of forcing with the pit, I fill half of the chamber with dung before I lay in the bushes, leaves, and mould, because this enables a labourer to tread the dung well down, by standing on it as it is thrown in between the iron bars, thus securing, at the first, a continuance of heat for a considerable time. The bushes which I use to lay over the iron bars are such as I obtain from the thinnings of the plantations and prunings of shrubs; they are laid across the bars, and must be sufficiently strong to support the weight of the mould above them. The leaves that are interposed

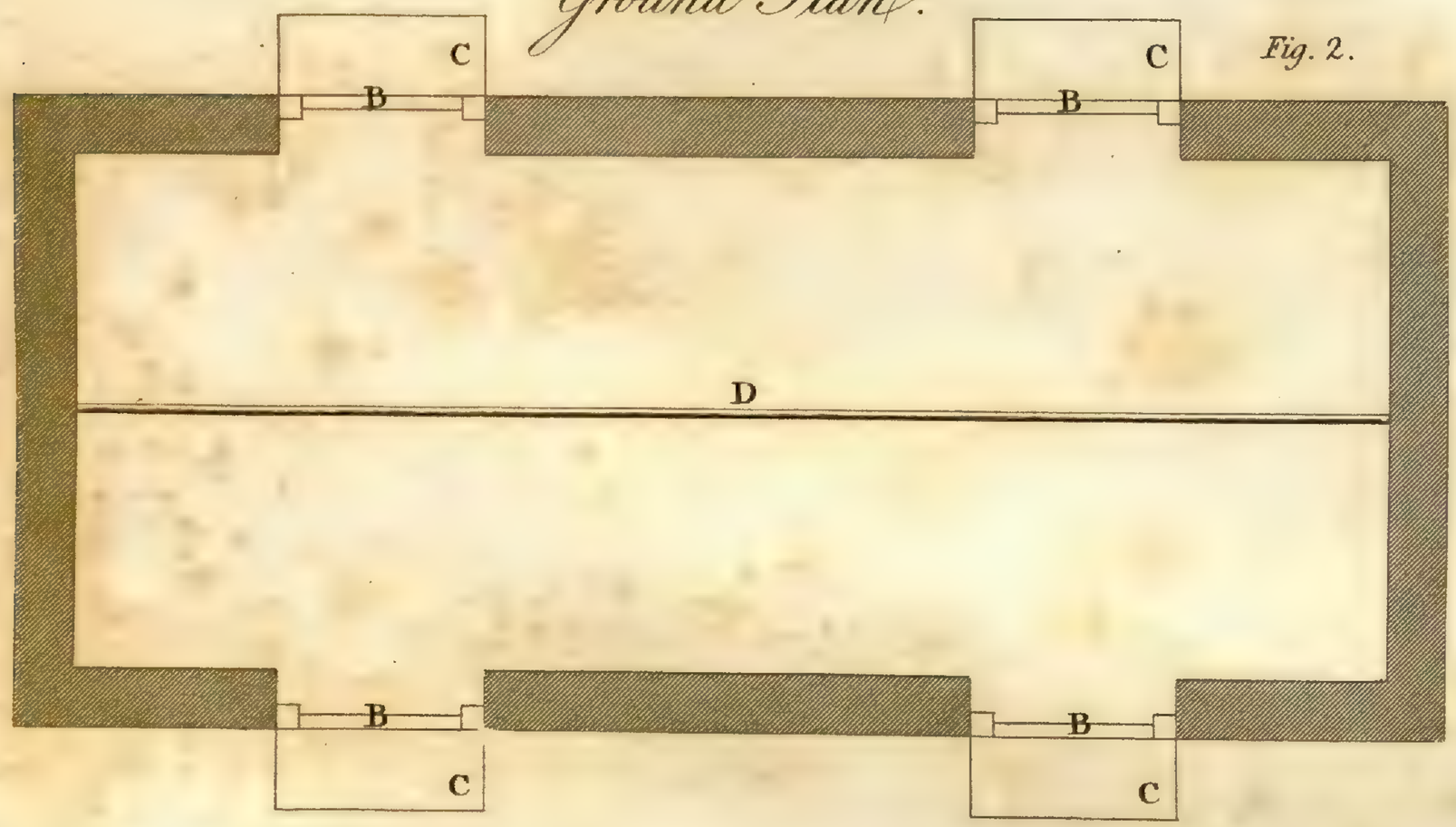
Elevation of the Back Wall.

Fig. 1.



Ground Plan.

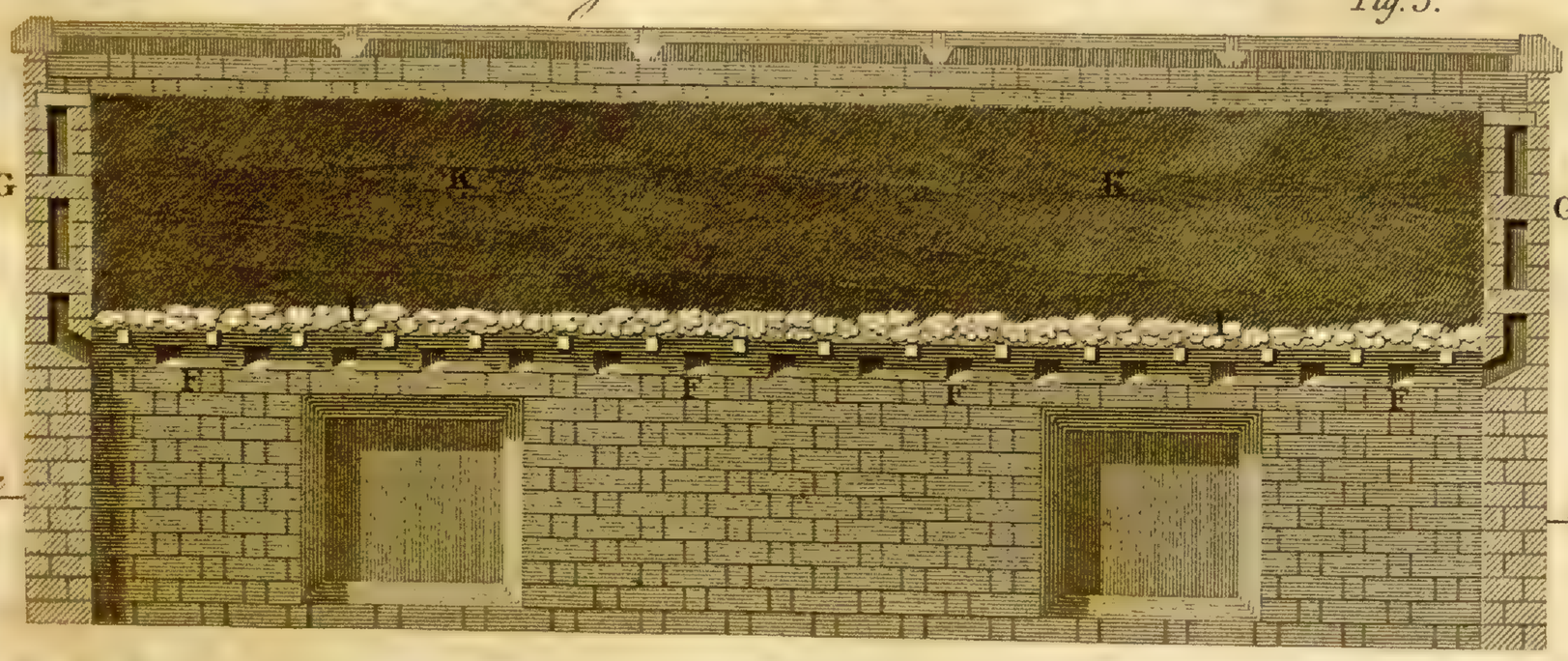
Fig. 2.



Improved Cucumber Pit, erected in the Garden at Castle Ashby, by Mr. John West, C.M.H.S.

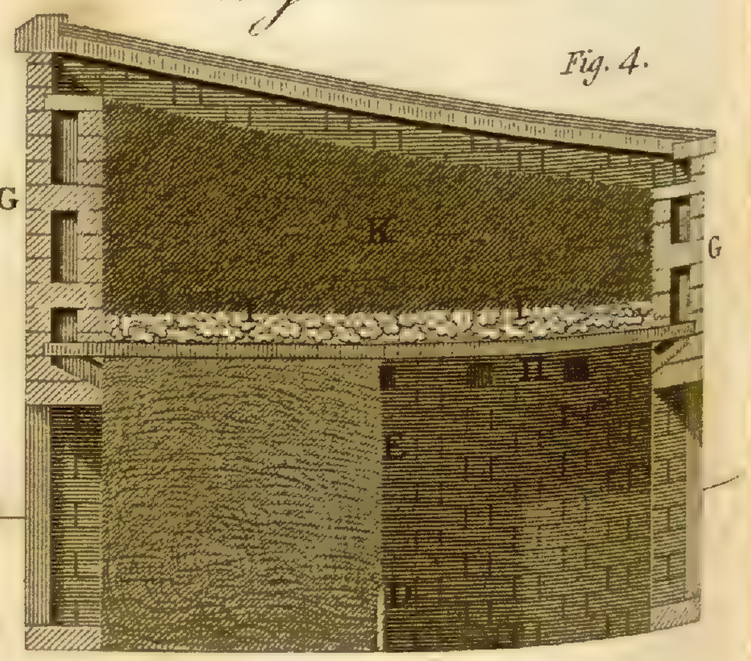
Longitudinal Section, shewing the Interior of the Dung Chamber at the back.

Fig. 3.

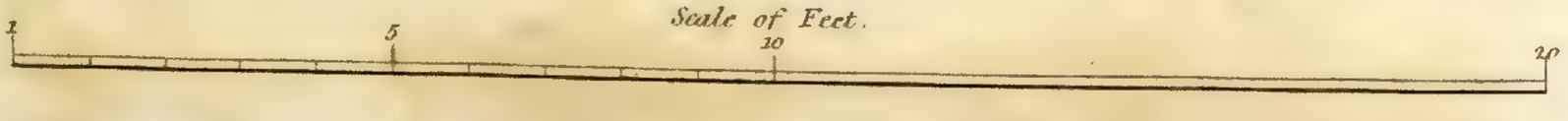


Cross Section.

Fig. 4.



Scale of Feet.



Engraved by J.B Taylor

between the bushes and the mould ought to be quite dry when they are used for this purpose: I recommend a thick stratum of leaves, if they can be obtained. The mould may be put in directly after the leaves are laid on the bushes, and should be sloped, to correspond with the inclination of the glass lights.

I remain, Sir,
Your most obedient humble servant,
JOHN WEST.

Castle Ashby,
September 5, 1819.

References to the Plate.

A A. Doors at the back of the dung chamber.

B B B B. Grooves in which the doors are fixed.

C C C C. Areas sunk in the earth in front of the doors.

D D. Bar at bottom of the chamber, to serve as a guide in filling in the dung.

E. The chamber half filled with dung.

F F F F. Holes to let the heat pass from the chamber into the cavity.

G G G G. Cavity surrounding the bed, the sides of which are tied together by bricks, as represented.

H. Iron bars at the top of the cavity, to support the bushes, leaves, and mould; the ends of these are shewn by the white marks in the longitudinal section, Fig. 3.

I I I I. Stratum of bushes laid across the bars, and covered with leaves.

K K K Mould laid upon the leaves.

L L. Plugs in the back wall, to let the steam pass off when necessary.

XXXV. *Account of the Method of* Dwarfing Trees and Shrubs, *as practised by the Chinese, including their Plan of Propagation from Branches. By* John Livingstone, *Esq. of Macao in China, Corresponding Member of the Horticultural Society.*

Read, June 20, 1820.

However much a correct taste may depreciate the art of *dwarfing Trees and Shrubs*, no doubt can be well entertained that the subject possesses some attractions to physiologists, since it may, in several respects, extend our information regarding the laws of organic life.

Lord Bacon is the only early writer who appears to have heard of the practice of dwarfing. In the sixth century of his *Sylva Sylvarum*, paragraph 535, we find it stated, that "Trees are generally set of roots, or kernels, but if you set them of slips, (as of some trees you may, by name the Mulberry) some of the slips will take; and those that take (as is reported) will be dwarf trees." In the preceding paragraph he mentions another report regarding dwarfs, which clearly shews that the method was not then well understood in England, or, if ever known, was possibly then, as it is now, among the *artes perditæ*.

Before Lord Bacon's time, the Polo family had imparted to the learned of Europe many facts regarding the arts in China; and it is probable, that the art of printing, the composition of gunpowder, the polarity of the needle, the

management of the silk-worm, and the dwarfing of, at least, Mulberry trees, were among the many novelties with which their journey to China had silently enriched the stores of European knowledge.

In the fifth century of his *Natural History*, section 427, Lord Bacon also mentions, that "from May to July, you may take off the bark of any bough being of the bigness of three or four inches, and cover the bare place somewhat above and below, with loam, well tempered with horse-dung, binding it fast down; then cut off the bough, about Allhollontide, in the bare place, and set it in the ground, and it will grow to be a fair tree in one year.

"The cause may be, for that the baring from the bark keepeth the sap from descending towards winter, and so holdeth it in the bough; and it may be also, that the loam and horse-dung applied to the bare place, do moisten it and cherish it, and make it more apt to put forth the root. Note, that this may be a general means for keeping up the sap of trees in their boughs, which may serve to other effects."

This is the general method now practised in China for obtaining by far the greatest number of fruit trees and shrubs. It is extended also to many of the forest trees which they cultivate; and is a preliminary step in the formation of nearly all their dwarf trees and shrubs. Of the origin of the practice no record seems to have been preserved. It was probably very remote, since we see, on the oldest specimens of porcelain, the same figures of dwarf trees that the Chinese admire at the present day. Radicating plants or boughs, coming accidentally in contact with the ground, and

taking root, would readily suggest the plan. The improvement of denuding a circular portion of the bark, might also have been pointed out by fortuitous occurrences, such as the friction of one bough against another.

The practice is correctly stated by Lord Bacon. That mentioned by Dr. Howison, in the Transactions * of the Society for the encouragement of Arts, Manufactures, and Commerce, is certainly not the method followed by the Chinese.

The Pterocarpus Marsupium, one of the most beautiful of the large trees of the East Indies, and which grows in the greatest perfection about Malacca, affording, by its elegant, wide-expanding boughs, and thick spreading pinnated leaves, a shade equally delightful with the far-famed Tamarind tree, is readily propagated by cuttings of all sizes, if planted, even after the pieces have been cut for many months, notwithstanding they appear quite dry, and fit only for the fire. I have witnessed some of three, four, five, six, and seven inches in diameter, and ten or twelve feet long, come to be fine trees in a few years. While watching the transformation of the log into the tree, I have been able to trace the progress of the radicles from the buds which began to shoot from the upper part of the stump, a few days after it had been placed in the ground, and marked their progress till they reached the earth. By elevating the bark, minute fibres are seen to descend contemporaneously as the bud shoots into a branch. In a few weeks these are seen to interlace each other. In less than two years the living fibrous system is complete; in five years no vestige of its log origin

* See volume xxv. page 14.

can be perceived ; its diameter and height are doubled, and the tree is in all respects as elegant and beautiful as if it had been produced from seed. These details are introduced, because I think they afford a clear explanation of the process of nature, which, with so little assistance, converts branches into trees, and will help to unfold those subsequent steps, by which the same process is so modified, that, instead of a full-formed beautiful tree, the bough is tortured into a grotesque dwarf.

Dr. MORRISON informs me, that the Chinese call dwarf trees *Koo-Shoo*, ancient trees ; and that they express the rearing of them, by terms signifying bending down, or repressing ancient trees, which means much the same as dwarfing.

When the dwarfing process is intended, the branch which had pushed radicles into the surrounding composition in sufficient abundance, and for a sufficient length of time, is separated from the tree, and planted in a shallow earthenware flower pot, of an oblong square shape ; it is sometimes made to rest upon a flat stone. The pot is then filled with small pieces of alluvial clay, which, in the neighbourhood of Canton, is broken into bits, of about the size of common beans, being just sufficient to supply the scanty nourishment which the particular nature of the tree and the process require. In addition to a careful regulation of the quantity and quality of the earth, the quantity of water, and the management of the plants, with respect to sun and shade, recourse is had to a great variety of mechanical contrivances, to produce the desired shape. The containing flower pot is so narrow, that the roots pushing out towards the sides are

pretty effectually cramped. No radicle can descend, consequently it is only those which run towards the ends, or upwards, that can serve to convey nourishment properly, and it is easy to regulate those by cutting, burning, &c. so as to cramp the growth at pleasure. Every succeeding formation of leaves becomes more and more stunted, the buds and radicles become diminished in the same proportion, till at length that balance between the roots and leaves is obtained which suits the character of the dwarf required. In some trees, this is accomplished in two or three years, but in others it requires at least twenty years.

On a review of this process a striking analogy will be perceived to exist between this management of plants, and a somewhat similar treatment of animals when young, since defective nourishment, digestion, and assimilation, stunt the growth of both, of which the Chinese have taken advantage with a horrible ingenuity.*

The Chinese say that all trees and shrubs may be made from boughs, and that these, under proper management, may

* I have Dr. Morrison's authority for stating that some Chinese feel gratified in expending considerable sums of money in giving those poor tortured trees freedom; a sufficient proof that they possess the kindlier affections, and that they believe that vegetables are endowed with sensation, as well as animals. But truth requires that the reverse of this picture should be stated from the same high authority. Young children are sometimes kidnapped for the purpose of making them also a *Koo-Shoo*. Their limbs, trunk, and head are moulded into an infinite variety of strange unnatural forms, and their eyes are not unfrequently put out. It is shocking to humanity to add, that such horrible practices are patronized in the Heavenly Empire, for a good livelihood is gained by the exhibition of a human *Koo-Shoo*.

be made dwarfs, but the larger the branches the better they are for the dwarfing process.

The manipulations may be thus enumerated in detail.

1st. The bark must be removed quite round the branch, to the breadth of about half its diameter.

2d. The denuded part is to be covered with a composition similar to that used in England for grafting. For common use the Chinese consider clay tempered with almost any kind of earth sufficient.

3d. For large branches the Elm, Mitchellia Champacca, &c. a covering of straw, coarse cloth, &c. is used; for the Orange, Peach, &c. the composition itself is sufficient. No contrivance for the application of water is ever seen in this part of China. On this point I have made diligent enquiry among the best gardeners, and have been always assured that the sap of the boughs is sufficient to keep up a proper supply of moisture.

4th. The time of separating the branch varies in different trees from about six weeks to three months. Success in a great measure depends on the radicles being sufficiently abundant, and having acquired the necessary degree of tenacity to bear planting: in this the eye of the gardener is his only sure guide.

5th. When it has been ascertained that the root is sufficient to preserve the living system, any exuberance of growth is at first carefully repressed by cutting off the extreme points of the branches, as well as by rubbing off part of the buds and leaves.

6th. The branches are next bent and contorted by wires,

and various other mechanical means, to suit the taste of the operator.

7th. After which, the various means already alluded to are practised to complete the work; and which vary in different places. It is the custom in the province of Fo-kien, where the best dwarfs are said to be formed, to entice ants to destroy the heart wood, into which openings are made to introduce sugar and the like.*

Dr. Howison has stated, in the Paper† already referred to, that fruit trees made by abscission bear more fruit than similar boughs left on the tree from which they are taken. This may, I think, be readily imagined to be the case by an inattentive observer, for dwarf trees being much in demand in China, and bringing a price in proportion to the crop of fruit which they bear, especially Oranges, Finger fruits, Peaches, Carambolas, Grapes, &c. the artists select invariably the branches which are most loaded with flowers, for abscission, which operation does not take place till the fruit is nearly ripe. In this state they are exposed for sale. The fruit is sufficiently well tasted, but is never intended for use by the Chinese. They are contented with the handsome appearance of the miniature fruit tree, on which the fruit is also

* The Capsicum Cerasiforme, and some other species of the same genus, are planted in pots of not more than two or three inches in diameter. The plants are reduced thereby to the most diminutive size, with fruit scarcely larger than our Currant. The Dracæna ferrea, and some species of Bambusa, are made to grow in the corners of their rock work, chiefly by means of water, to the height of only a few inches. The Gardenia florida, by the same mode of treatment, is equally stunted.

† Transactions of the Society of Arts, &c. volume xxv, page 14.

usually more permanent than on trees of full size. In succeeding seasons, the dwarf tree flowers well, and the flowers, for the most part, remain longer, than on the old or large trees; little fruit, however, comes to maturity, and that little is not good. The Peaches are without juice, and the Plums remain hard.

Of fruit trees the Chinese admire most the dwarf Plum tree. Should it be hollow, with its boughs twisted and contorted into all kinds of fantastic forms, it is so much the more esteemed; for such a dwarf tree a very large price will be cheerfully given. Of forest trees the Elm seems to be the most approved, and it is the most common; but being much more easily formed than the Plum, its value is never so considerable.

XXXVI. *Notice respecting the* Pitmaston Orange Nectarine. *In a Letter to the Secretary. By* John Williams, *Esq. Corresponding Member of the Society.*

Read September 19th, 1820.

Dear Sir,

Agreeably to your request, I send you specimens of my *Seedling Nectarine*. The yellow colour of its flesh will distinguish it from any of the old varieties: the flavour and aroma are peculiar, and partake in some degree of the mixed taste and smell of a Plum and a Nectarine; it has none of the fine vinous acid so much commended in the pulp of the Red Roman, and Newington Nectarines, but the admirers of rich saccharine fruits will perhaps think it an acquisition, and deserving of culture. It sprang from a stone of the Elruge ripened in the fine season of 1815. The tree grows with great vigour on a south wall, and affords large blossoms, resembling, in this respect, the White Nectarine, but the petals and stamina are of a much deeper red tint. I have reason to think it will prove hardy, and at present it seems perfectly free from mildew, or other disease,

Believe me,
dear Sir,
yours truly,
John Williams.

Pitmaston, near Worcester,
September 15th, 1820.

The Pitmaston Orange Nectarine

Note by the Secretary.

This Nectarine is certainly a valuable addition to our stock of fruits. Amongst the sorts generally cultivated, the only Nectarine with yellow flesh is the Temple, and that is of quite a pale hue, and of very indifferent quality. Mr. Hooker's figure will assist the following description of the appearance of the *Pitmaston Orange Nectarine*, which is the name proposed to be attached to the fruit above described. It is of good size, flat, and wide at the base, almost heart-shaped, the summit being elongated, and terminating in a point or nipple: skin smooth, of a dark brownish red on the side exposed to the sun, and of a rich yellow on the shaded side; at the junction of the colours, the red is blended with the yellow in streaks and dots, and on the darkest part are a few streaks of an almost black purple hue; the inside is a deep golden yellow, very bright and equal, with a narrow radiated circle of fine crimson round the stone. The flesh is melting and juicy, high-flavoured and richly saccharine. The stone is rather small, narrow, pointed, very rugged, and parts cleanly from the flesh.

XXXVII. *On the Management of the* Roseberry Strawberry, *in order to make it produce Fruit through the late Summer, Autumn, and Winter Months.* *By Mr.* Isaac Oldaker, *F. H. S. Gardener to His Majesty the Emperor of Russia.*

Read, August 1st, 1820.

The *Roseberry Strawberry* is now so well known that any further description of it is unnecessary. I shall therefore confine myself to an account of my treatment of it, in order to make it bear fruit from the end of July to the beginning of January. This will be best done by a detail of its management in the last year.

In the spring, when the plants of the Roseberry Strawberry which I had forced in the hot-houses had ceased to produce fruit, I set them out of doors, in their pots, and gave them a plentiful supply of water once a day in dry weather. In three weeks after being thus exposed, they began to shew blossom, with a disposition to produce a promising second crop; I then planted them in the open borders, with their balls entire, in rows two feet apart, and eighteen inches between each plant in the rows, and gave to each plant a good supply of water, to settle the earth to their roots. The first planting of this description was in the end of May; I made a second in June, and a third in the beginning of July, watering them all freely once in every day, when the weather was dry; these waterings kept them moist, and caused them

* See Horticultural Transactions, vol. ii. p. 380, Plate 27.

to grow very luxuriantly, and to produce abundance of fine fruit at the end of July; they were kept in this thriving and bearing state through the summer and autumn, and continued to produce fruit until the frost put an end to their bearing.

The Roseberry Strawberry, in general, makes its flower stems very short, and produces its fruit near to the ground, consequently in wet weather, as well as from frequent waterings, the fruit becomes dirty, and unfit for the table. By planting in an highly manured soil, and by abundant supplies of water, I caused their flower stems to grow so vigorously as to elevate themselves above the leaves, which gave me an opportunity of tying them to sticks, and thus kept the fruit perfectly clean under all circumstances.

In the middle of October I selected three hundred plants that were in the best state for producing fruit, and took them up with care, so as to keep the earth to their roots as completely as possible; I planted them in pots of a size larger than those out of which they had been turned, in the beginning of the summer, and tied up the flower stems of each plant to a stick, to prevent the fruit from rotting by waterings or the damps arising from the soil: I then gave to each pot a good supply of water, to render the earth solid round the roots, and set them on shelves, in a hot-house, near to the glass, giving them a free supply of air in the day time, and shutting them up close on cold nights; and when shut up, I kept the heat of the house as near as I possibly could to 55 degrees of FAHRENHEIT's thermometer. I gave them water only when they were dry; and when any leaves or flowers decayed, I cleaned them away, to prevent the fruit

rotting, which it frequently does at that late season of the year, unless especial care is taken to keep the plants free from decaying substances; these plants bore fruit freely till Christmas, and I gathered the last plate of Strawberries from them on new year's day.

When the Strawberry plants had done bearing, I left them in the house, by way of experiment, to ascertain if they would produce fruit through the winter; they blossomed freely, but they did not set their fruit so well as they blossomed; neither did they bear so well in the spring as those planted from runners in the previous summer and autumn.

The plants which I put out last May are at this time (the end of July) producing fine fruit, just the same as last year, and I am satisfied that if the Roseberry Strawberry is treated as above described, it will bear fruit as freely through the latter months of the summer and all the autumn, as in May and June.

XXXVIII. *An Account of Mr.* Walker's *improved Construction of Hot-house* Flues. *By* Alexander Seton, *Esq. F. H. S.*

Read, October 3d, 1820.

So much attention having of late been paid to the construction of Hot-houses and Green-houses, and so many communications having been made to the public respecting them, it may be supposed that there is little room left for the exertions of genius and science in that art; but I am persuaded that this is far from being the case, and that much may still be done towards its improvement. With this view I hope the Society will not deem unworthy of attention the following short account of *a new Mode of constructing flues*, invented by Mr. James Walker, whose abilities as an engineer are well known, and executed under his direction in a green-house erected for Thomas King, Esq. at Stamford Hill; and particularly so, as I am not aware of this mode being generally known, or of any thing of the kind having been adopted elsewhere.

The flue for conveying the smoke consists of an iron pipe, in this example square of eight inches on each side (but it does not seem material whether it be square or round), which is conducted in the usual manner from the furnace at one end, along the house and back to the chimney at the same end. This is inclosed in a thin case of brick or stone, and covered with flags about two feet and a half high,

and two feet wide. On the top of this case are apertures at certain distances, suppose twelve or fifteen feet, which open and shut at pleasure, to permit the escape of the heated air. The iron flue is conducted into the end of the case from the furnace, which is placed in the usual manner in a stoke-pit, on the outside, and a few feet lower than the floor of the house. To the end of the case, where the flue enters, there is an air-flue conducted upwards from the bottom of the stoke-pit, where its orifice is provided with a valve to shut, if required, but this is rarely, if ever, necessary. At this opening the supply of air enters, and being heated as it passes along in contact with the iron flue, escapes through the apertures in the top of the case, and mixing with the atmosphere warms the house. Here the ingenuity of the contrivance may be particularly remarked in the arrangement of the current of air; for, this current having its commencement when cold at the part of the flue which is hottest, it takes up the heat there, where it is least wanted, and carries it to those parts at a distance from the furnace where it is most needed; and as the valves will be chiefly opened in the latter situations, to permit its escape, it diffuses a nearly equal warmth over the whole house.

This apparatus is similar in many respects to that of Mr. KENT,* and though the latter was entirely unknown to Mr. WALKER, it is evident that he had in view the principles whereon it is founded. The chief advantage common to both is, that the case, or coffer, intercepts the radiance of the heat, and provides a store of heated air, which being conveyed away from the immediate neighbourhood of

* See Horticultural Transactions, vol. ii. p. 389.

the furnace, mixes with the atmosphere of the house in different parts, and thereby produces an equality of temperature which could not otherwise be obtained. Whereas, with the use of a single flue, even of brick or stone, the heat which emanated by radiance is so powerful near the furnace, that it is often injurious to the plants in that situation, while in the more remote parts of the house it is so far expended as not to be sufficient for their wants. This circumstance precludes the use of iron for a single flue, but the caseing prevents all inconvenience of that nature; and the iron, from its superior conducting power, is the means of saving a great portion of the heat, which would, if brick or stone were used, escape with the smoke by the chimney. Another advantage is derived from the iron flue by means of the closeness of its substance, as it entirely precludes the escape of smoke and carbonic acid, and hydrogen gas, which always takes place more or less, however imperceptibly, through the pores of the brick and mortar; and which I believe to be the chief cause of the inferiority commonly observed in the effects of fire flues on the health of plants, when compared to those of steam pipes; for whatever might be the effects of any direct application of steam, we cannot easily conceive that it will, when confined within an impermeable pipe, operate in any other way than by communicating the heat uncontaminated by noxious exhalations.

Some of the covering stones of Mr. Walker's caseing are hollowed, to receive water for supplying steam occasionally, when wanted in the house. This is often very useful; but it appears to me that it may be done with more effect by adapting a vessel to the iron flue itself, near the furnace, and

leaving one of the covering flags moveable, to afford access to it. Several parts of the top of Mr. WALKER'S flue are fixed with screws, so as to admit of its being opened for cleaning; and should round flues of cast iron be used, which I suppose would be the cheapest, the best arrangement for that purpose would, perhaps, be openings at the corners.

This short sketch will, I hope, be sufficient to impart a distinct idea of the principles of Mr. WALKER'S invention: and I deem it superfluous to enter into a detail of the minute particulars of the parts, as every individual will be competent to direct them according to circumstances. I have only to add that Mr. KING'S green-house was found, on the trial during last winter, which was very severe, to answer to the fullest extent all the expectations that could have been formed of it, having been remarkable for uniformity of temperature both in the several parts of the house, and at the different times of the night.

XXXIX. *On the Treatment of the* Dendrobia, Aerides, *and other* parasitical Plants. *In a Letter to the Secretary. By the Hon. and Rev.* William Herbert, *D. C. L., F. H. S. &c.*

Read, August 1, 1820.

Dear Sir,

I am informed by a friend at Calcutta, that he cultivated, with great ease, all the *Dendrobia*, *Aerides*, and other parasitical plants, by tying them, with twine, to the stem of a tree, or to the under side of a branch, and placing above them a pot of water, with a hole at the bottom, through which a string passed, nearly as large as the aperture, by means of which the water was gradually and continually conducted to the upper part of the parasitical plant, which requires to be constantly moist and shaded; and that a tree with smooth bark answered the purpose best. He mentions that Dendrobium Pierardii, fastened to a tree and irrigated in this manner, will, in a little more than a year's time, produce pendulous racemes of flowers, from two to six feet long, and it appears likely to thrive with me under the same treatment. I had previously found no difficulty in establishing Epidendra on the stems of trees in the stove, by cutting a notch in the bark and inserting the plant like a graft, and tying moss about it to support it, till the young roots had attached themselves to the bark; but from want of sufficient moisture, they have not made much progress, or flowered with me. I have

now adopted the above mentioned mode of irrigating them, with full confidence that it will succeed in our stoves, as well as it does at Calcutta; and very soon after its application to a sickly Epidendron, growing on the stem of Sterculia Balanghas, vigorous young fibres began to sprout from it on all sides. I am very much inclined to think, that most of such plants would attach themselves to the sides of a porous stone or vessel, or of a dead root, if constantly irrigated, and thrive upon them as well as upon a living tree, especially if the stone or root were covered with growing moss, for I have observed the fibres of more than one sort attach themselves strongly to the outside of the pot in which they are planted; and I conceive that they might be beautifully cultivated, upon an ornamental cone of porous pottery, filled with water and furnished, on the outside, with niches, in which the plants might be fixed, with a little moss or peat to promote their growth in the first instance.

I have found the parasitical plants in danger of perishing, from want of moisture on a deciduous tree, during its season of inactivity, but that deficiency would probably be removed by constant irrigation. The neatest and most convenient vessels for that purpose, perhaps, would be little tubs, such as are sold at toy shops, which might be easily tied to a branch, and perforated with a small gimblet. A short string, of which one end is twisted round, or at least in contact with the plant, and the other inserted into a phial of water, will also be found to convey a regular, though less plentiful, supply of moisture, acting in the manner of a siphon. I have used it advantageously to nourish a graft, and promote its union with the stock. For the cultivation of parasitical plants

in pots, I recommend placing the pots on a back flue, in a tin tray, about two inches deep, and half filled with wet sand, giving an abundant supply of water, but not sufficient to produce rottenness by its stagnation. I find the growth of Crinums, which also like a moist heat, to be prodigiously rapid, with that treatment. I should suggest a mixture of porous stones, or bits of broken pots, with old tan, or such peat as contains a portion of half decayed wood, and a garnish of moss to the pot, as preferable, for parasitical plants, to the loam which some of our books have recommended.

I am,

dear Sir,

Your's very truly,

WILLIAM HERBERT.

Spofforth,
July 28, 1820.

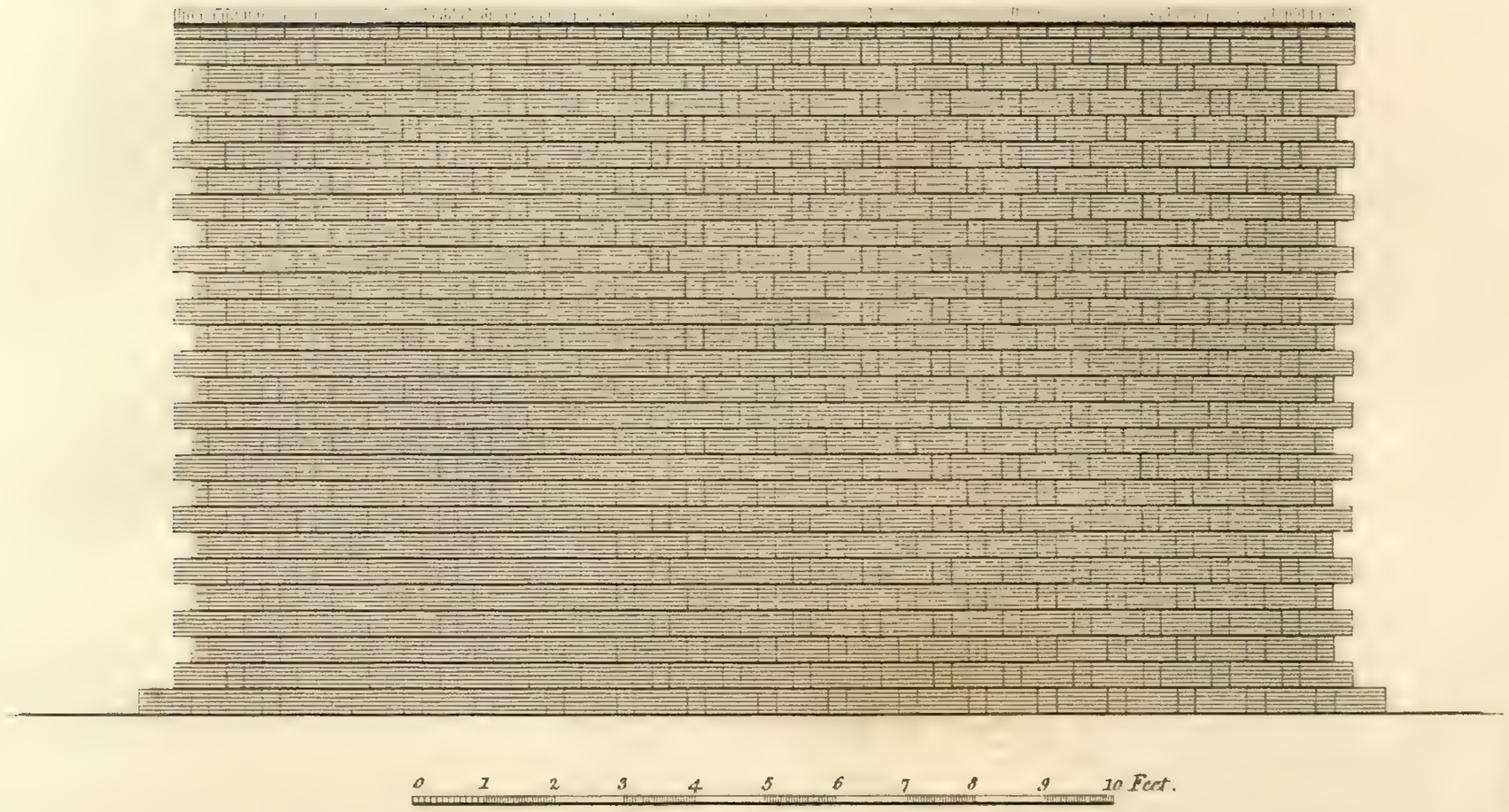
XL. *Account and Description of a* Hollow Wall, *erected in the Garden of the Earl of* Arran, *F. H. S. at Bognor, in Sussex. In a Letter to the Secretary. By Mr.* Henry Silverlock, *of Chichester, F. H. S.*

Read, March 21st, 1820.

Sir,

In compliance with your request I send you the following detail respecting the *Hollow Wall* which I have erected for the Earl of Arran at Bognor. It is built nine inches thick, with sound even-sized bricks, placed edgeways, the joints being carefully made, and laid with the very best mortar. The bricks are placed with their faces and ends alternately to the outside, so that those which have their ends exposed become ties to the surfaces of the wall. In each succeeding course, as the wall is built, the bricks with their ends outwards are placed on the centre of the brick which is laid lengthways in the course below it. Thus a hollow space is formed in the middle of the wall, of four inches width, which is only interrupted where the tying bricks cross it; but there is a free passage for air from top to bottom of the wall. The wall is covered close at the top with a heading course of bricks, on which is a coping of Portland stone, with a projection of two inches, and strengthened at every twenty feet by piers of fourteen inch work, executed in the same manner with bricks on edge, which are so worked in, as to preserve the continuity of the

Elevation of Hollow Wall.



Ground Plans of Hollow Wall.

Drawn by E. Fuller. Chichester.

Engraved by J.B. Taylor

hollow space through the wall. The annexed elevation and plans of the wall will make this description more intelligible, and as it may be desirable, in many situations, to vary the piers, I have given two ground plans, one with the whole projection at the back, and the other back and front. The wall in Lord ARRAN's garden is of the first description, and is so represented in the elevation figured.

From experience in my own garden, and from that of others, for whom I have built walls in this method, I have no hesitation in pronouncing it to be sufficiently strong for all garden purposes, the saving of expense in its construction is full one-third, and it has the advantage of becoming dry after the soaking of long rains, much more rapidly than a solid wall of the same or any other thickness.

I remain,
Sir,
your very obedient Servant,
HENRY SILVERLOCK.

Chichester,
Jan. 20, 1820.

XLI. *Account of a Method of Managing* Vines, *in a Common Grapery. By Mr.* John Mearns, *Corresponding Member of the Society, Gardener to* William Hanbury, *Esq. at Shobden Court, Herefordshire.*

Read, April 4th, 1820.

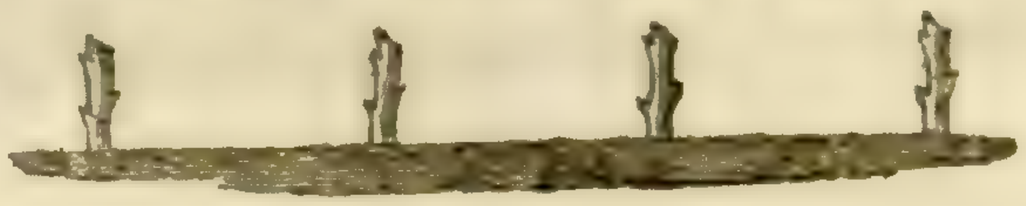
The house, of which a section, as well as an elevation and section of one end, is given in the annexed plate, was planned by our respected President for my then worthy employer, the late William Hanbury, Esq. in the autumn of 1805, some weeks previous to my coming into his service at Shobden Court; it is sixty feet long by fourteen feet wide, and the length of the rafters, or slope of the glazed roof, is a little more than sixteen feet.

My method of managing *Vines* in this grapery is in some respects different from any other with which I am acquainted; by it I have never failed, for the last eleven years, to obtain the same invariably luxuriant crops, although I have never allowed above one-third of the bunches which shewed themselves, to remain on the Vine; and each succeeding crop has been as uniform as if the bunches had been placed, artificially, at equal distances over the whole roof. I have no doubt but, under the same treatment, the Vines will continue to be equally productive for any length of time. The shoots are so vigorous that their girth is, generally, at the end of the season, from an inch and a half to an inch and three quarters. The branches, in their most

luxuriant growth, never appear in any confusion, even to those who are but little skilled in the cultivation of Grapes, and the method is so simple, that it may be described with the assistance of figures, so as to be perfectly comprehended by any person in the least acquainted with the nature of the Vine. I have never deviated from it since I planted the Vines in the spring of 1806.

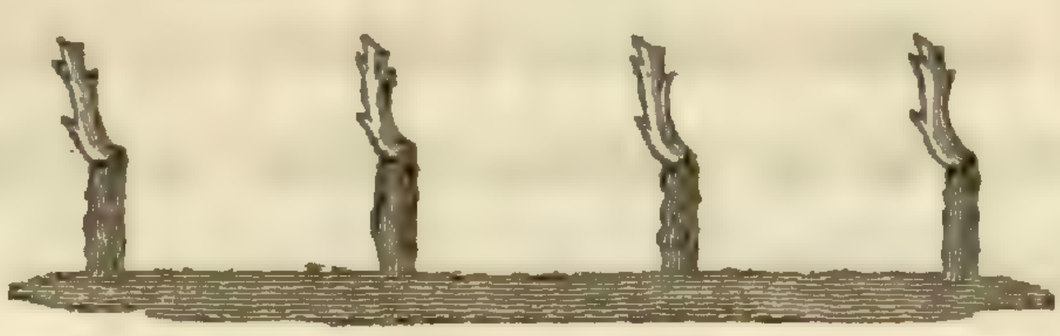
In the latter end of December 1805, I obtained a sufficient number of Vine plants from London, of different sorts, which appeared so very strong that I concluded they were all well rooted, I therefore did not think it necessary to examine them till the ground in the house was ready for their reception. In the mean time I plunged them, with their pots, into a dry mellow soil, on a south-border, till the spring. When the place was in regular order for their reception, I turned the plants carefully out of the pots, and had the mortification to find some but very indifferently rooted. This must invariably be the case, whilst the practice continues of forming new plants by introducing the shoots of the preceding year into the bottom of the pots, and simply passing them up through the mould

My Vines were planted inside of the house at two feet and a half apart, nearly close to the front wall, and eighteen inches distant from the flue which runs in front (see Plate VIII. fig. 1.); and as both the wall and the flue were built on wide arches, the roots had liberty to extend themselves either way without interruption. After they were planted, and watered to settle the earth round their balls, I headed them down to within a foot of the soil, as is here represented.



I only allowed one shoot to proceed from each plant in the first year; rubbing off all the others before they had completely burst into leaf, the uppermost being the one I retained. In the course of the summer I watered them with soft pond water, as I found they wanted it, and frequently with drainings from the farm yard, and with soap suds, when I could procure any.

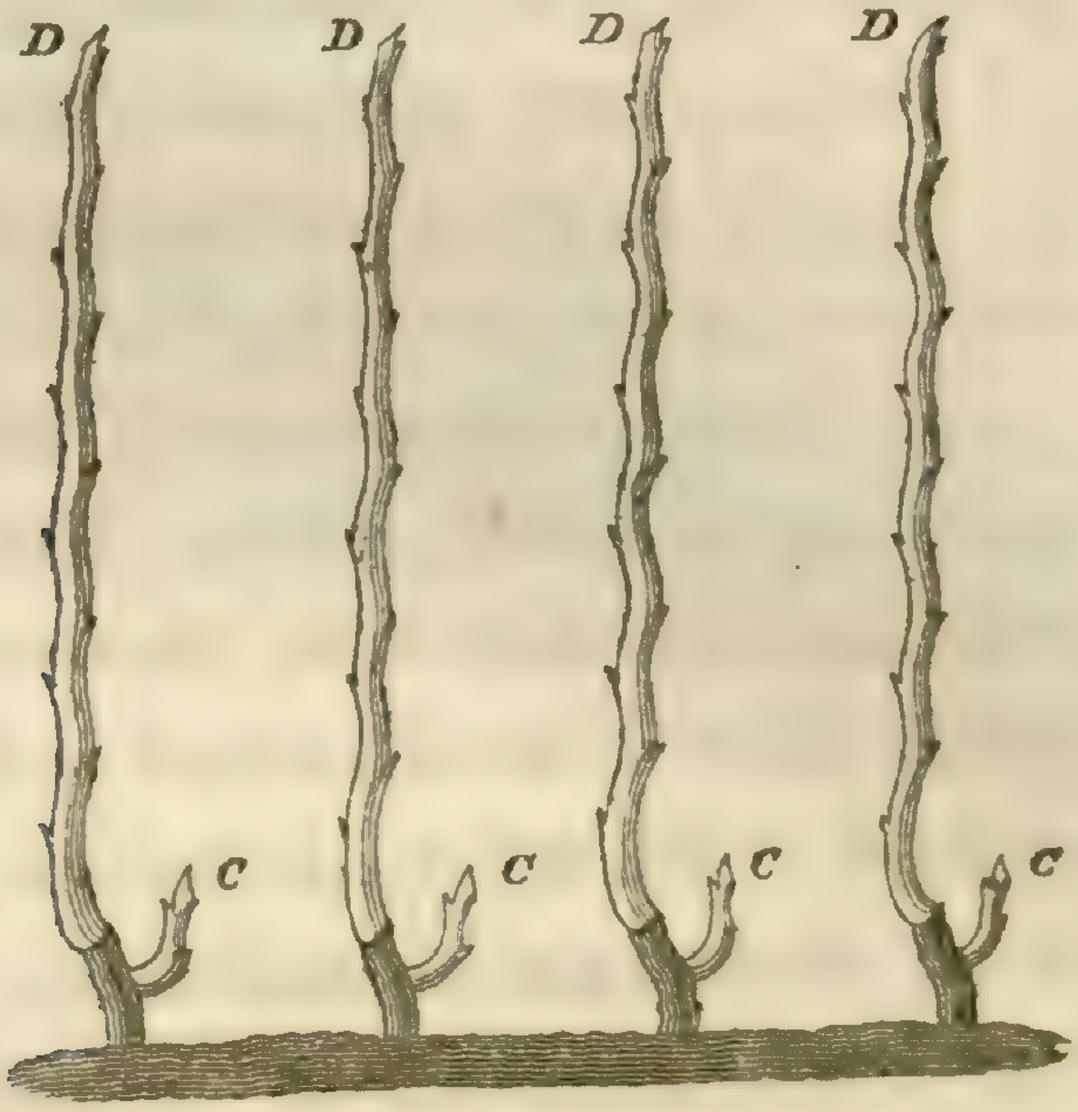
During the first summer, the Vines made quite as much progress as I could have expected, and their different degrees of vigour were nearly in proportion to the state of their roots when planted. When the leaves had fallen in the end of the year, I cut them down to the second or third eye, when they had this appearance.



In the beginning of the succeeding February I excited them gradually into action by a little fire heat, and when the buds were ready to burst, I rubbed all off but the two finest on each plant; the strongest of these, I intended to furnish bearing wood for the lower half of the roof in the following year. The most feeble of the two was cut down to the second or third eye, at the end of the season, and at the same time the strongest shoot was reduced to eight feet, being the length of the lower half of the rafter. Whilst they were growing during the second summer I kept the shoots regularly trained* upwards, divesting them of tendrils and late-

* The house is furnished with wires a quarter of an inch in diameter laid in horizontally under the rafters, at ten inches from the glass, and at ten inches apart, the shoots being tied to these wires are carried upwards in a perfectly straight direction.

rals. I only allowed the strongest of the two leading shoots to run about three, four, or five joints beyond the middle of the roof, (where I intended to cut them at their winter pruning) according to the vigour of the different shoots: and then I pinched off their tops, in order to strengthen the eyes for the ensuing season. The weaker shoots I only suffered to run about three, four, or five feet, according to their strength, and I then pinched off their tops, never allowing them to push above two or three eyes from the same place, during the remainder of the season, without pinching them back; and then retaining only a single eye, unless I found it necessary, in consequence of the vigour of the Vine. I kept the laterals stopt back also to the first leaf. At the fall of the leaf, I cut the leading shoots at the middle of the rafter, and the lower one at the third eye, as is here represented.

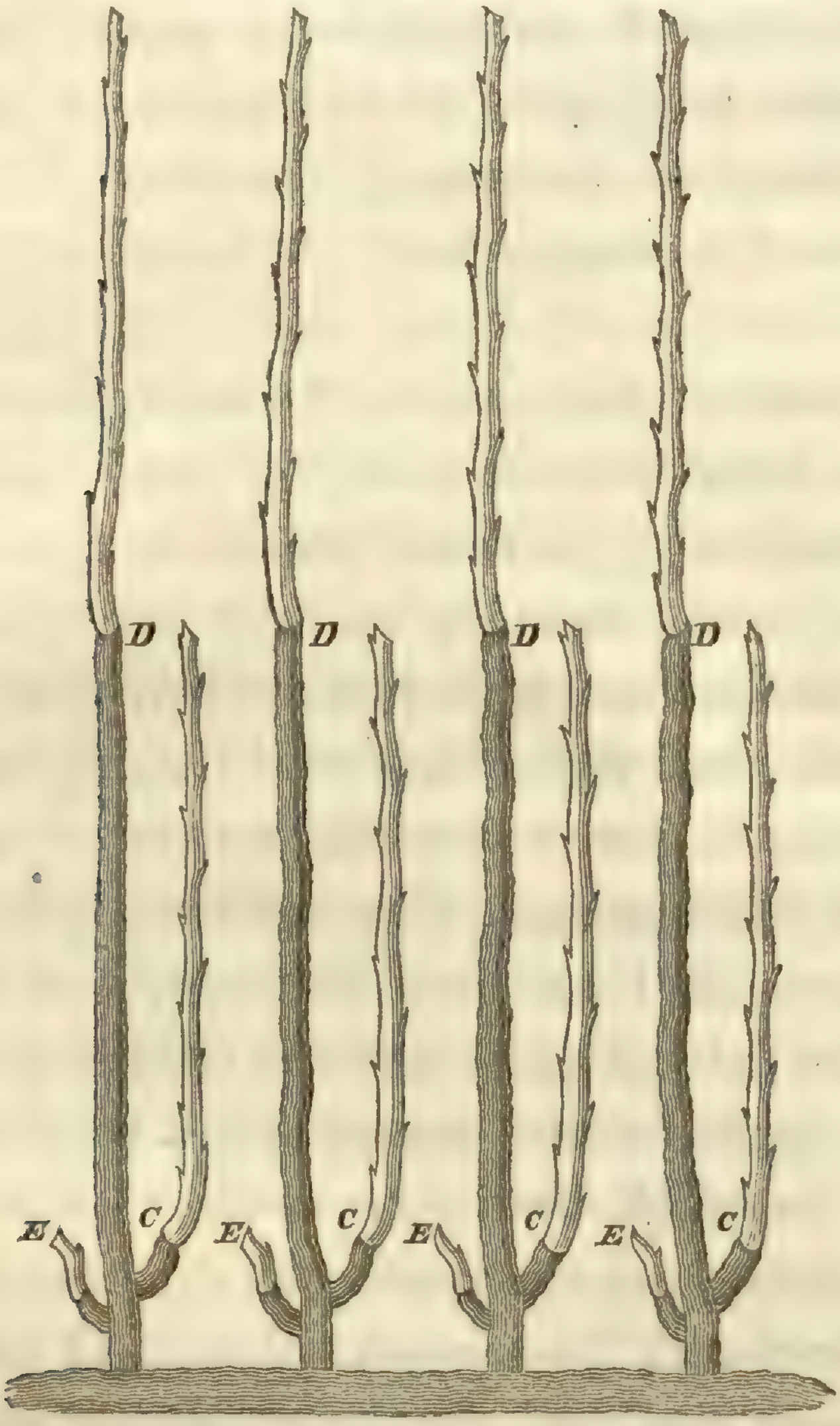


The above sketch represents four separate Vine plants, at the end of the second season after they had been planted, when the strongest shoot had been headed down to the middle of the rafter D, and the weakest shoot to C.

In the third season I put fire to them, about the middle of February ; the buds swelled very regularly and strongly, and as they all burst with double buds, which healthy Vines will always do, I slipt out the lowermost bud as carefully as I could with my finger nail. Each eye shewed three, and in some sorts, four bunches ; but I only permitted the finest shewn bunch on each eye to remain, except in those kinds which bear very small bunches ; these I suffered to mature two, and even three bunches from an eye. In those where I preserved only one bunch, I stopped each shoot from the eyes at the joint above the finest shewn bunch, divesting it of other bunches that might be below it ; and when I kept more than one bunch I stopped the shoot at the joint above the uppermost. I carefully preserved the uppermost shoot from the end of my bearing branch at D, as a leader to furnish the upper part of the rafter with bearing wood for the next year ; and I also trained upwards the leading shoot from the bottom spur C, which I intended should become the bearing branch for the lower half of the roof in the following season. I was careful that none of the tops of these leaders should meet with accident, till they had reached their destination for the season, that was, about three or four joints beyond where they were intended to be cut down, to the winter pruning. All the buds on the bottom spur, C, were rubbed off, except the leading one. As I bore in mind the necessity of a bottom spur to produce a succession shoot from the bottom in the following year, which was necessary to the regularity of the system I contemplated, I selected one of the most convenient buds for my purpose, from the bottom of the old stems, all of which were now putting out

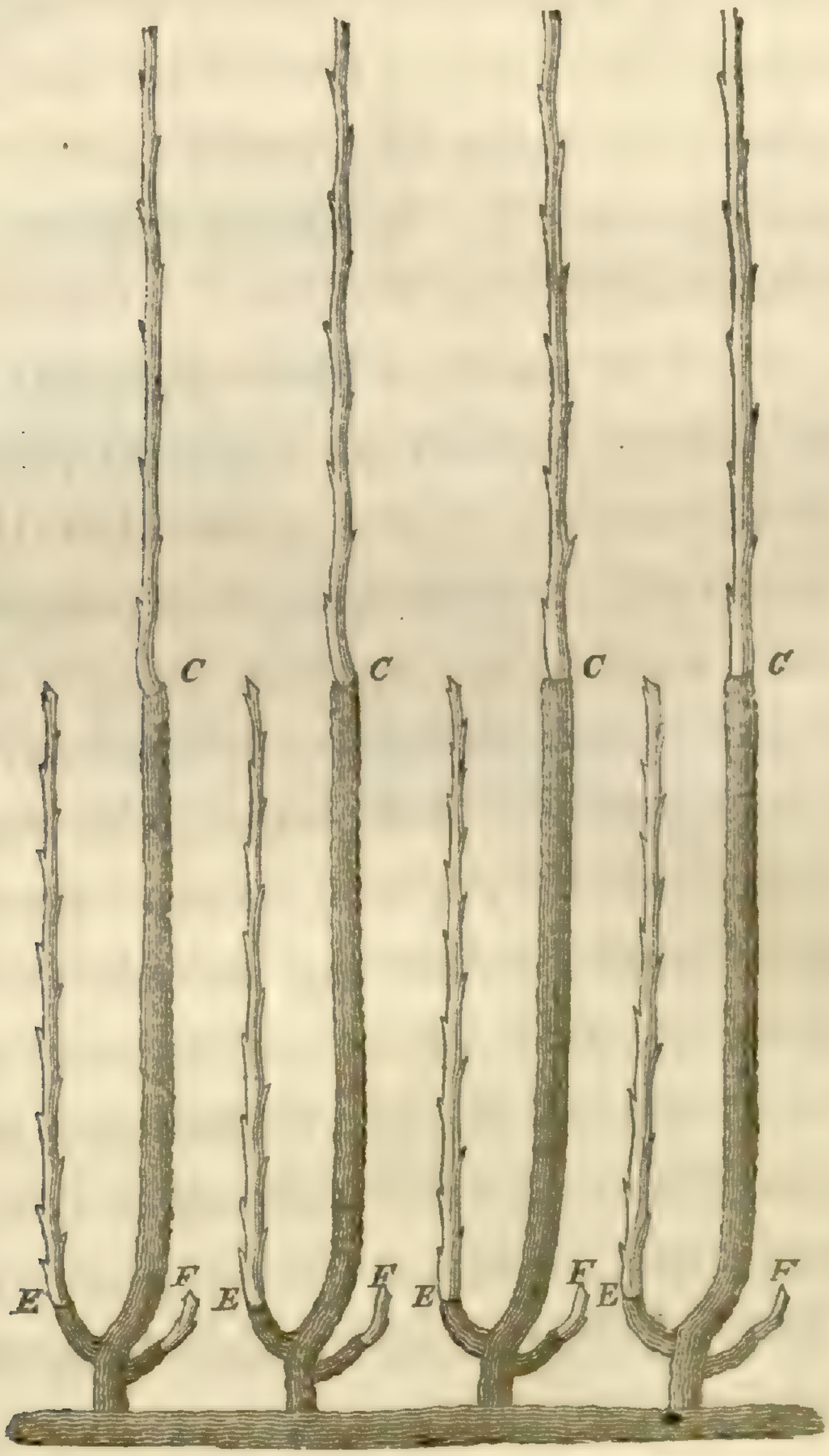
several buds; but I suffered none, except the selected one, to remain long after it had made its appearance. The management of the young shoots of the year was, in this and the following seasons, the same as I have before detailed.

In the autumn of this, the third season, the lower half of the house was furnished with a crop of ripe Grapes upon the wood of the preceding year, and parallel to it, on each Vine, grew a young shoot, intended to bear the lower crop the next year; whilst the upper half of the house had single shoots trained from the end of the bearing wood, which shoots were also to bear a crop the next year; and, besides these, a third shoot on each Vine had been trained from the bottom bud, which I had not removed, and which were about four feet in length, having been treated as the weaker shoots in the second year's management, which I have described, and to which they were similar. When this half crop was gathered, and the leaves had dropped, I cut off the top leaders level with the uppermost wire of the house, to which they were tied, and the lower leaders level with the middle of the roof, (the top and bottom leaders, or bearing wood for the next season, being each eight feet long,) and the bottom or weak shoot, above described, was cut down to the second or third eye, as the lower shoot had been cut in the preceding winter. All the spurs of the lower part of the shoot, which had now reached the top of the house and had borne the crop of grapes, were cut clean out. The following was the appearance of the same four Vines, after they had been pruned in the third winter, when they were in a state to produce their full crop in the following season.



In the fourth summer a full crop was produced both in the upper and lower half of the house ; the longer shoot D bore its bunches on the upper half of its length, and it was not suffered to extend itself by a leading shoot ; the shorter shoot C bore its bunches on its whole length, and extended itself by a leading shoot to the top of the house ; the spur E was suffered to become a shoot, extending a few joints beyond half the length of the rafter ; and from the bottom of the old wood a weaker shoot, as before, was trained, to become the foundation of the lower shoot of the next season.

In the pruning season, D, which had become the longest branch in the previous winter, was entirely cut away from the bottom, the shorter branch C, which had now become the longest, was stripped of its spurs on its lower half of old wood, and its upper half was left for bearing, the extended spur E became the lower bearing branch, and the weak shoot F, (see the next figure) at the bottom, was reduced to a spur, to furnish the lower wood for next year.



The preceding figure represents the plants after being pruned the fourth season, the sides being reversed.

With this alternation of pruning, the system has been continued to the present time, and may continue as long as it shall be desirable to have the house in bearing.

I consider it of the utmost importance to the bold breaking of the buds, and to the strength of the wood, not to force the Vines hard, until the first leaves arrive nearly at their full size. But after that period I give them a much less portion of air, suffering the sun to raise the thermometer to 90° or 100°, before I give any. There is no danger of drawing the wood after that stage of growth, and if the thermometer sinks at night to 60°, the vines will do better in a higher temperature in the day.

During the last four years, I have stopped the bearing branches at the bunch, instead of the next joint above it, which is the usual practice; for I found that the fruit did equally well, and it divested the branch of an incumbrance, while it allowed a much larger portion of light to come into the house, together with a more free circulation of air among the fruit and young wood. I blind all the eyes on each fruit spur as soon as they push, except the uppermost which I retain, to draw up the sap to nourish the fruit: I never suffer them to push above a joint or two, before I pinch them back, always cautiously retaining an eye. By constant stopping, the eyes soon increase to a large cluster, when I frequently find it expedient to pinch out a great part of them with my finger nails, unless I see danger of its exciting my next year's fruiting eyes to burst prematurely.

I am particularly cautious that nothing should happen, to injure the leaf that accompanies the bunch, for, if that is lost, the fruit of course will come to nothing.

During the summer I inspect the Vines regularly every morning; seeing that the ends of my leaders are in their proper places, and not obstructed; picking off tendrils, and stopping the laterals above the first leaf, on my next year's bearing wood; tying down fruit spurs carefully, and stopping any shoot that may have sprung from the ends of them; as well as other shoots that may come out from the previously stopped laterals.

In thinning the bunches, I consider it of the utmost importance to begin early, that is, when the Grapes are about the size of vetches; I go over them with the thinning scissars two different times, and to some sorts I find it necessary to give a third thinning. In the first thinning, I cut off about two, three, or four, inches from the ends of the long rambling bunches, of such kinds as the Hamburghs, Frontignacs, St. Peters, Nice, and Muscat of Alexandria; for the extremities of these are generally very imperfect, and not fit for the table; and only deprive the other part of the bunch of much support; I carefully tie up the shoulders, that they may not crowd too much on the lower parts of the bunch and so that the whole may have the benefit of light and air, as well as sufficient room to swell; but I am cautious not to tie them too high, which is injurious.

I give my waterings in much larger quantities as the Grapes approach to maturity, particularly if the weather renders it necessary, from a want of rain; but I leave it

off entirely when the berries arrive at their full size, after which I keep the house as dry as possible.

I approve greatly of Mr. French's method of applying the steam and heat of dung to the forcing of Grapes,* and have used it with advantage, especially in the earliest part of the forcing, for the last two seasons; having introduced the dung the whole length of the house, as is represented in the section (Plate VIII, fig. 1. A.) and managing it in the same manner as is described by the late Mr. George Anderson in the interesting Paper referred to.

References to the Plate.

Figure 1. End Section of the house.

A. Bed of Dung introduced into the house in the spring.

B. Vine plant after it has made its first summer's shoot and been cut down.

C. Path.

DDD. Drains.

E. Mode of ventilating through apertures in the back wall three feet long by one foot deep; these are closed, when necessary, on the inside, by a sliding shutter.

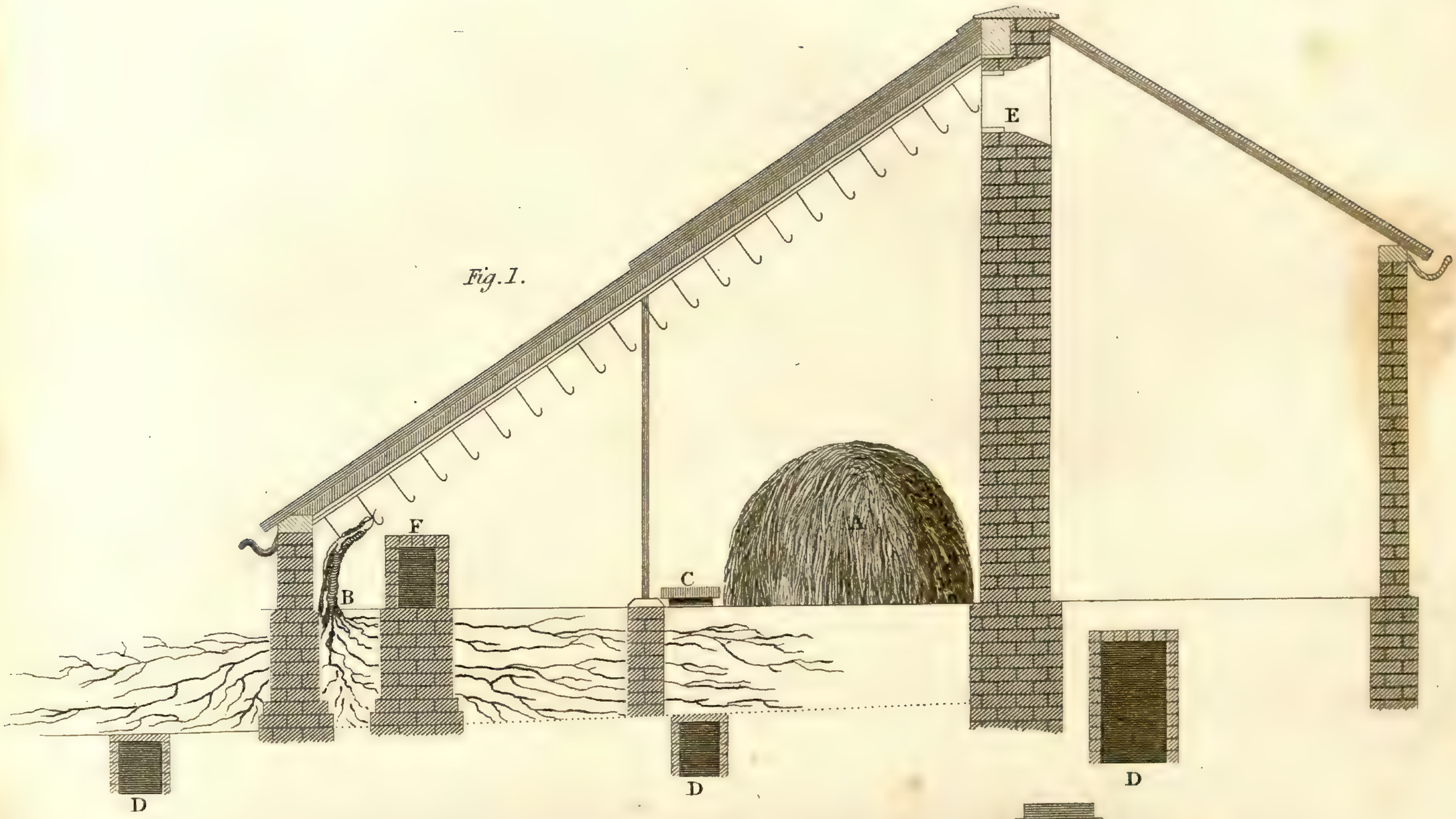
F. Flue; only one passing through the house.

Figure 2. Elevation of one end, and section of the back of the house.

G. Fire-place, with a rise of two feet from the grate to the bed of the flue, to promote the draft.

* See Horticultural Transactions, vol. ii. p. 252.

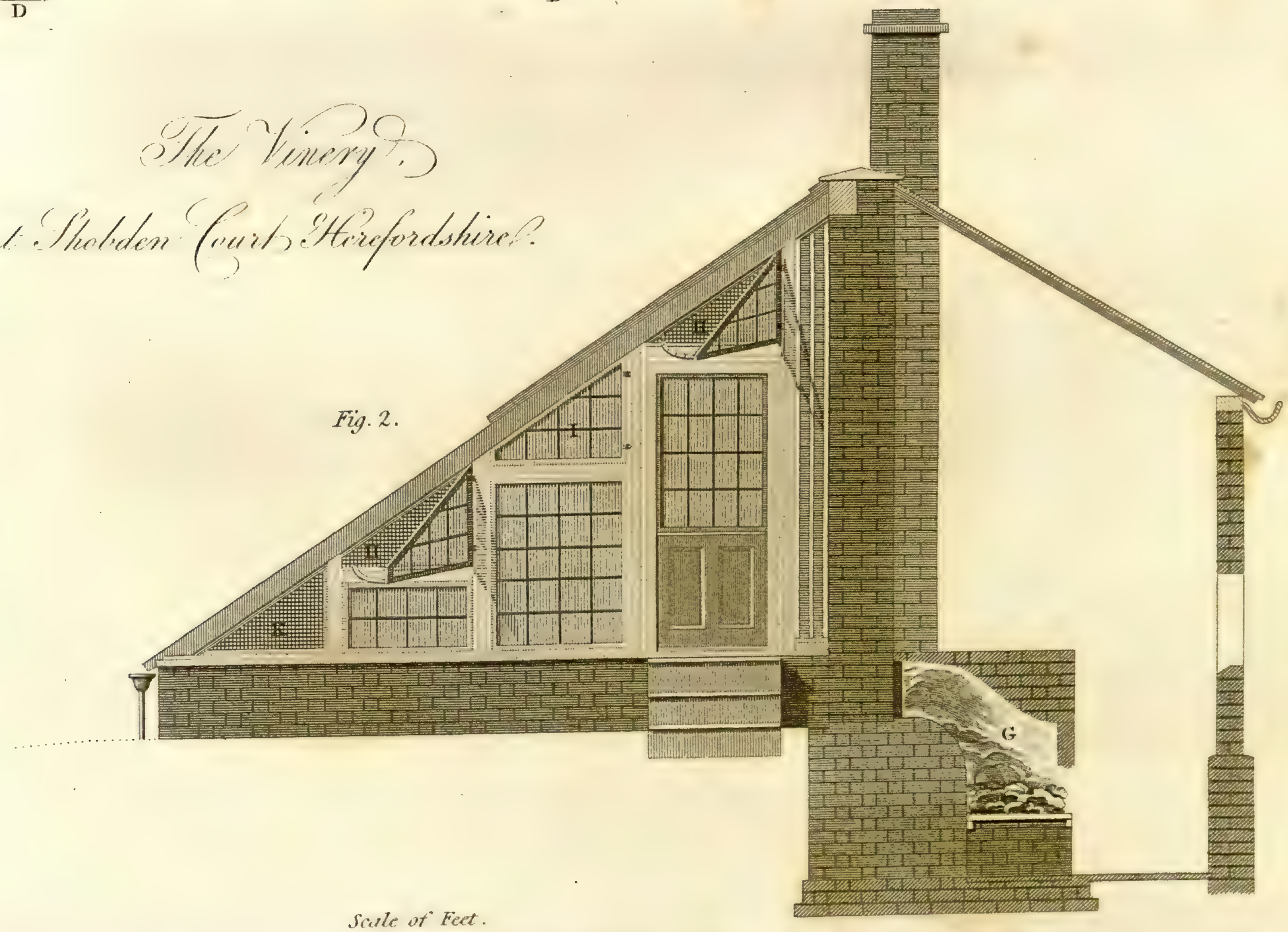
Fig. 1.



The Vinery,

at Shobden Court Herefordshire.

Fig. 2.



Scale of Feet.

1 5 10

Engraved by J.B. Taylor.

The angle lights at the ends of the house are attached to the upright wood work of the framing, by hinges, and open from within by means of long iron handles, which being perforated, can be fixed in any part on a pin, and thus afford such extent of opening as may be convenient. The insides of these apertures are covered by canvas stretched on a frame, to exclude the wasps when the lights are thrown back.

HH. Two of the angle lights open.

I. One of the angle lights closed.

K. The angle light removed, to shew the aperture covered by canvas stretched on a frame.

XLII. *Account of a newly produced* Hybrid Passiflora. By Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read, November 7, 1820.

In the Paper on the production of Hybrid Vegetables, which was read before the Society in December last, Mr. Herbert has stated his belief that an intermixture might be obtained between "the Scarlet Passiflora Princeps,* and the hardy Passiflora cærulea." The experiment, which had then been begun, has since been successfully completed at Fulham, in the nursery of Messrs. Whitley, Brames, and Milne, by Mr. Thomas Milne, a Fellow of this Society, and one of the partners in that firm. The flower which was exhibited at the Meeting, on the fifth of September last, was produced by a plant raised from the seed of P. racemosa impregnated by P. cærulea.

The Passiflora racemosa, since its introduction into this country, has not produced fruit spontaneously, the cause of which may be attributed to some imperfection in the state of its farina, occasioned probably by want of a proper temperature. In the experiment I am now about to record, this defect was supplied from the more perfect stamina of the P. cærulea. During the months of May, June, and July, 1819, about thirty flowers of a plant of the first named species were impregnated artificially by Mr. Milne, with

* Now usually called Passiflora racemosa.

the farina of the latter; the germens of the flowers thus treated, swelled, became fruits, and ripened ; the other flowers on the same plant, which were not so impregnated, were abortive. The fruits ripened in September ; they were about two inches and a half long, oval, marked with three longitudinal furrows, and of a yellow colour; from the account of the plant given by Professor Brotero, of Coimbra, in the *Transactions of the Linnean Society*,* they seem to have attained their proper size ; the seeds however of most of them were imperfect, and Mr. Milne conceives that all those which vegetated came out of either one or two of the fruits only. The seeds were sown in December, and seven plants were raised : one of them, having been kept in the stove, blossomed this autumn, and its first flower was exhibited to the Society at the time I have above stated.

The male parent of this new plant was introduced into our gardens so long ago as the year 1695, and is well known by the name of the Common Passion Flower : though a native of the Brazils it is sufficiently hardy to endure the climate of England when trained to a south wall, in which situation it frequently ripens its fruit. It has been lately very faithfully represented in the *Botanical Register*,† and a figure of it was also published in an early number of the *Botanical Magazine*.‡ The plant usually cultivated, and which is the type of the species, has leaves with oblong oval lobes, and it was this which was used in the production of the Hybrid ; there is a variety which has leaves with very long

* Vol. xii. p. 74. † Plate 488. ‡ Plate 28.

narrow lanceolate lobes, by which it is readily distinguished; the flowers of the two are alike.

The female parent of the Hybrid is only a recent introduction; it was brought from the Brazils to Lisbon by the late Mr. Emperor Woodford, and having been cultivated in his garden at that place, was communicated by him to Professor Brotero of Coimbra, who in 1815 sent a description of it, with the name of P. racemosa, to the Linnean Society: this (with a figure of the plant) was published in their *Transactions*,* and it is the first printed account which exists of the plant. It first blossomed in this country in the stove of Messrs. Loddiges and Sons, at Hackney, in 1817, and it was then figured in their *Botanical Cabinet*,† under the name of P. Princeps, but this name has given way to the one previously assigned to the species by Professor Brotero. It has been subsequently figured in the *Botanical Register*,‡ and in the *Botanical Magazine*.§ There is a variety of it, in which the outer double series of the rays of the nectary are entirely white, instead of being stained in part with purple; this variation is noted by Professor Brotero, in his account in the *Transactions of the Linnean Society*. The first mentioned plant was the one used by Mr. Milne in the production of his hybridized seeds.

In conformity with the judicious suggestion of Mr. Herbert,‖ as to the proper plan of naming these artificial occupants of our gardens, I propose to call this new production

* Transactions of the Linnean Society, vol. xii. p. 71, plate 6.

† Vol. i. plate 84. ‡ Plate 285. § Plate 2001.

‖ See Horticultural Transactions, vol. iii. p. 195.

Passiflora cæruleo-racemosa.

the Passiflora cæruleo-racemosa ;* but I am not quite certain whether, when the remainder of the produce of the same intermixture shall have flowered, we shall not be obliged to resort to some further mode of distinguishing them from each other ; for of the six remaining plants which have not yet blossomed, though one seems to correspond with that now under notice, yet each of the other five have such differences as indicate a probability of their being distinct. Another season will probably clear up this circumstance ; for I think that most of the plants are sufficiently strong to produce flowers next summer ; by which time also the station in the garden which they will be able to sustain, will also have been ascertained. Mr. MILNE expects that some of them will have partaken sufficiently of the hardy properties of their male parent to be able to withstand the severity of our winters, to prove which they have been planted in the open ground, against walls with different aspects, by way of experiment, during the ensuing winter.

The drawing of a branch of the new hybrid, which has been executed by Mr. LINDLEY, is a faithful representation of it, as it appeared this season ; but the minute and peculiar beauties of the blossom of a Passion Flower can never be adequately represented on paper. This new plant has remarkable excellencies of this description ; its blossoms seem to have taken from each parent those properties of their respective flowers which conduce most to their beauty, and to have

* The plan, of giving the specific name of the female parent with that of the male annexed in the ablative case, has been also used by Signor CARLO BELLARDI of the University of Pavia, in his *Saggio Botanico-Georgico*, published at Milan in 1809.

united them in itself. It is also more than probable that as the plant acquires greater strength, a considerable improvement will take place in its flowers, as well as in the size of the leaves, and its general appearance.

I have subjoined a parallel description of all the parts of the two parents and their offspring, a comparison of which will best shew the effect of the impregnation in the changes produced in the respective parts of the two originals, and a separate inspection of that of the mule will afford a fair character of the plant. These are accompanied with sections of the smaller parts of the three flowers, which will materially aid the description; for these I am indebted to Mr. LINDLEY, to whom also I have to acknowledge my obligations for his assistance in the composition of the descriptions.

P. cærulea. THE MALE PARENT.	*P. cæruleo-racemosa.* THE HYBRID.	*P. racemosa.* THE FEMALE PARENT.
Perennial and Shrubby.	Perennial and Shrubby.	Perennial and Shrubby.
Stem bluish green, much coloured with purple, but generally on one side only, striated below, cylindrical above, slightly five angled.	*Stem* bright green, often coloured with red, nearly round, striated.	*Stem* dark green, round.
Stipules persistent, dark green with a reddish margin, spreading, reflexed, in shape resembling half a cordate leaf, with an arista at the ends.	*Stipules* like the female, but a little less cordate, and smaller.	*Stipules* deciduous, pale green, veined, slightly tinged with red, erect, oblique, ovate, pointed, but without an arista.
Leaves not large, thin and five lobed; lobes ovate-oblong, blunted at the top, narrow, undulated, the lateral lobes shortest, with sometimes a smaller exterior segment of the same form as themselves, giving an appearance of seven lobes; dark green and shining above, with a red margin, underneath glaucous green, with a slight tinge of purple on the veins and mid-	*Leaves* intermediate in size, thick, slightly coriaceous, three lobed; lobes narrow, acuminated, and slightly undulated, nearly equal in size, the centre one a little longer than the lateral ones, one or both of which have sometimes an exterior segment like themselves, giving to the whole an appearance, as the case may be, of being four or five lobed; the whole in-	*Leaves* large, subcoriaceous and three lobed; lobes broad, acuminated, nearly flat and smooth; the centre lobe the longest, oblong; the lateral lobes divergent, obliquely ovate; the whole thickened, pale, and cartilaginous at their margin, above dark green, with a glaucous bloom, underneath paler, and conspicuously reticulated, lower parts of the sides of the centre

P. cærulea. THE MALE PARENT.	*P. cæruleo-racemosa.* THE HYBRID.	*P. racemosa.* THE FEMALE PARENT.
rib, which are apparent. A few glands are occasionally observable on the lower parts of the margin of the middle lobe of the leaf.	termediate in colour, with their edges cartilaginous and tinged with red, underneath paler, but the reticulations very conspicuous, the veins being tinged with red; lower part of the centre lobes notched, as in the female, without glands.	lobes slightly notched at the edges, but without glands.
Petiole inserted in the margin of the leaf, (which is slightly auriculated on both sides of the petiole) green, with four or more small elevated glands.	*Petiole* inserted like that of the male, reddish, with two pair of elevated glands.	*Petiole* inserted within the margin of the leaf, tinged with red, with two equidistant pair of flat glands.
Tendrils, coloured.	*Tendrils* tinged with red.	*Tendrils* tinged with red.
Flowers single, from the axillæ of the leaves.	*Flowers* single, from the axillæ of the leaves.	*Flowers* in long pendulous leafy racemes.
Peduncles round, long, green.	*Peduncles* round, not long, but longer than in the female, coloured.	*Peduncles* round, short, coloured.
Bracteæ persistent, large, oval, concave, pale opaque green, veined, blunted at the end, before expansion embracing and infolding the flower bud, very unlike the stipules.	*Bracteæ* persistent, small, but larger than in the female, ovate, green, tinged with red.	*Bracteæ* caducous, small, oval, green tinged with red, veined, like the stipules, but smaller and not so pointed.
Calyx when closed, swollen, ovate, slightly winged, pale green. *Tube* short, hollowed at the bottom, pale green. *Segments* when expanded rather broad, oblong, fleshy; inner surface concave, whitish; outer surface with an obselete keel and a mucro below the end, greenish.	*Calyx* when closed, as in the female, less coloured and more green. *Tube* nearly as in the female, but shorter and less coloured. *Segments* when expanded, as in the female, except that the inner surface is the same colour as that of the petals, and the outer surface a brown dingy red, as when unexpanded.	*Calyx* when closed oblong, five angled, or deeply winged, dull crimson red. *Tube* cylindrical, more than half an inch long, gibbous at the base, partially tinged with dark brownish purple. *Segments* when expanded, narrow, oblong, thin; inner surface slightly concave, bright crimson red; outer surface of the same colour as when unexpanded, with a deeply winged keel, the keel terminating underneath with a mucro.
Petals slightly longer, but narrower than the segments of the calyx, concave; inside white, sometimes slightly tinged at the edges with a reddish stain; under side inclining to green, with a green line or keel along the centre	*Petals* smaller and shorter than the segments of the calyx; slightly concave, both sides coloured alike at the first opening, pale purple without red, but afterwards inclining to purplish red.	*Petals* shorter and smaller than the segments of the calyx; slightly concave or nearly flat, inside of the same colour as the inside of the segments of the calyx, but on the back of a dull crimson red like that of the calyx when unexpanded.

P. cærulea. THE MALE PARENT.	*P. cæruleo-racemosa.* THE HYBRID.	*P. racemosa.* THE FEMALE PARENT.
Crown consisting of four series of rays.	*Crown* consisting of four series of rays.	*Crown* consisting of four series of rays.
First and second Series similar to each other in shape length and expansion, rising from the base of the petals, and flatly expanded, (the second lying regularly and closely over the first,) half the length of the petals; the rays filiform, fleshy and pointed; the upper or second series with three colours, purple at the base, white in the middle, and pale bluish purple at the top, the three colours appearing like concentric rings on the whole mass of rays, the rings usually all of equal breadth, but the white is sometimes larger sometimes smaller; the under or first series has always less of the purple ring, and much more of the white similarly disposed.	*First and Second Series*, nearly as in the male, as to shape, expansion and position, but rather longer, both series coloured alike, the lower half being a rich deep purple, the upper half white, sparingly spotted with purple, and tipped with white, the ends being rather blunted.	*First and second Series* similar to each other in shape, length, and expansion, rising from the base of the petals and expanded but not flat, (the second lying regularly and closely over the first) one third of the length of the petals; the rays filiform and fleshy, with blunted ends; both series coloured alike, one third towards the base being white, the remainder purple, but the ends of the rays are white.
Third Series within the second and contiguous to it, consisting of a circle of minute thin stumps, all purple.	*Third Series* situated as in both the parents, but the stumps are elongated into fine filiform rays about one eighth of an inch long, rising upright and slightly expanding, of a rich deep purple; the tips, which are also purple, are blunted.	*Third Series* within the second and contiguous to it, consisting of a circle of small thick stumps, white tipped with purple.
Fourth Series rising from the mouth of the tube of the calyx, at bottom membranaceous, united, and of a pale purple colour; above radiated, the rays are filiform, purple, and inclining in a direction generally nearly horizontal towards the shaft, which they embrace.	*Fourth Series* rising as in both its parents, the whole is radiated, the rays are filiform and fine, near half an inch long, with a blunt tip, the whole a deep purple; they rise upright in the centre of the flower, and do not converge.	*Fourth Series* arising from the mouth of the tube of the calyx, radiated; the rays are membranaceous at the bottom and filiform upwards, greenish white, and tipped with purple knobs, the whole converge towards the shaft, which they embrace.
Inside of the Tube of the Calyx shallow, closed on the top by a horizontal projecting rim extending from the lower part of the stipes or shaft; below this rim is a fleshy protuberance, from the side	*Inside of the Tube of the Calyx* intermediate in depth, the cup which surrounds the base of the stipes or shafts of the female is considerably elongated, and is very perceptible, the fleshy rim	*Inside of the Tube of the Calyx* very deep; at the base of the stipes or shaft a short five-lobed closely adpressed cup scarcely perceptible. At the lower part of the tube is a fleshy annular rim, with

P. cærulea.
THE MALE PARENT.

of the tube extending towards the shaft, and nearly filling up the cavity.

The Shaft, short, half the length of the petals, round, thick, white, without spots, having the rim noticed above at its base.
Filaments pale green.
Anthers large and greenish.
Ovary roundish, oblong, pale green.

Styles dark purplish brown.
Stigmas dull opaque green.

P. cæruleo-racemosa.
THE HYBRID.

which in the female rises from the side of the tube, and in that is thick, and though double not divided, in this is divided into two separate rims, the lower is rather longer and turns downwards, the upper is shorter, and converges to the shaft, but does not reach it; the membrane rising from its extremity corresponds to that in the female, it is very slightly conical, being nearly upright; it is terminated by a series of rays, more than a quarter of an inch long of a deep purple colour closely embracing the shaft, and ascending to a level with the summits of the fourth series of the rays of the crown, which they nearly resemble.

The Shaft similar to that of the female in all points, but smaller.

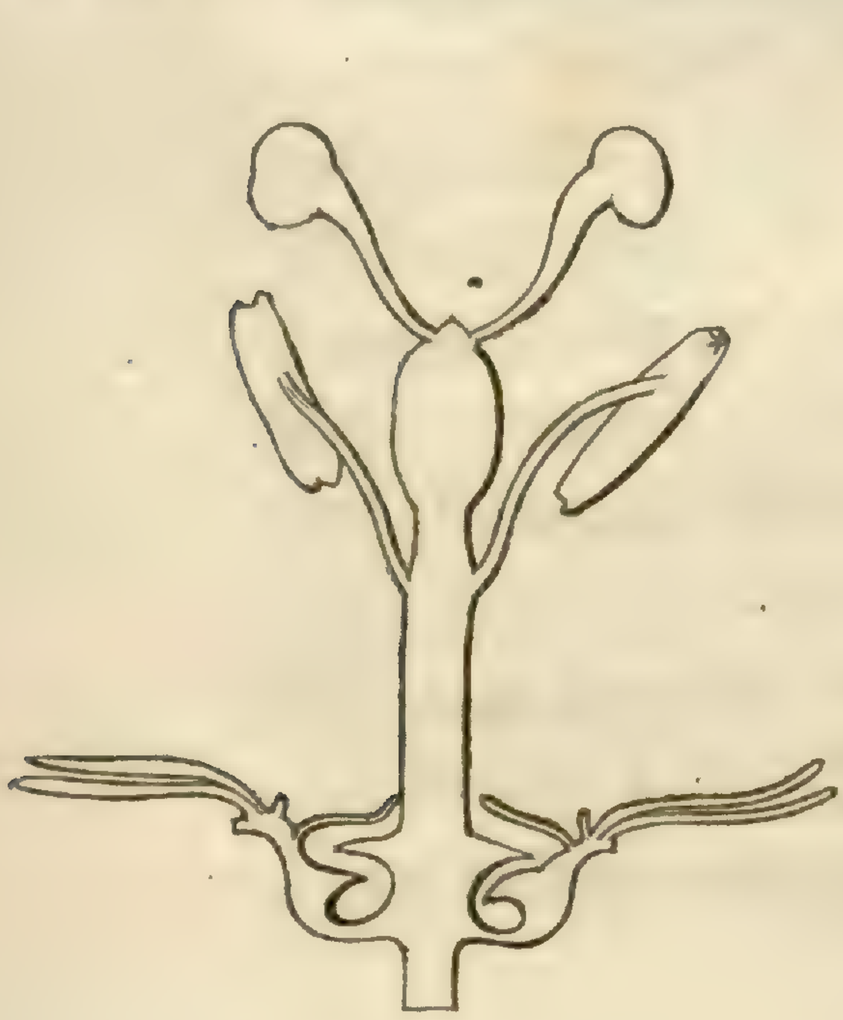
Filaments green and slightly spotted.
Anthers small, greenish yellow.
Ovary oblong, whitish, glaucous.

Styles purple.
Stigmas brownish green.

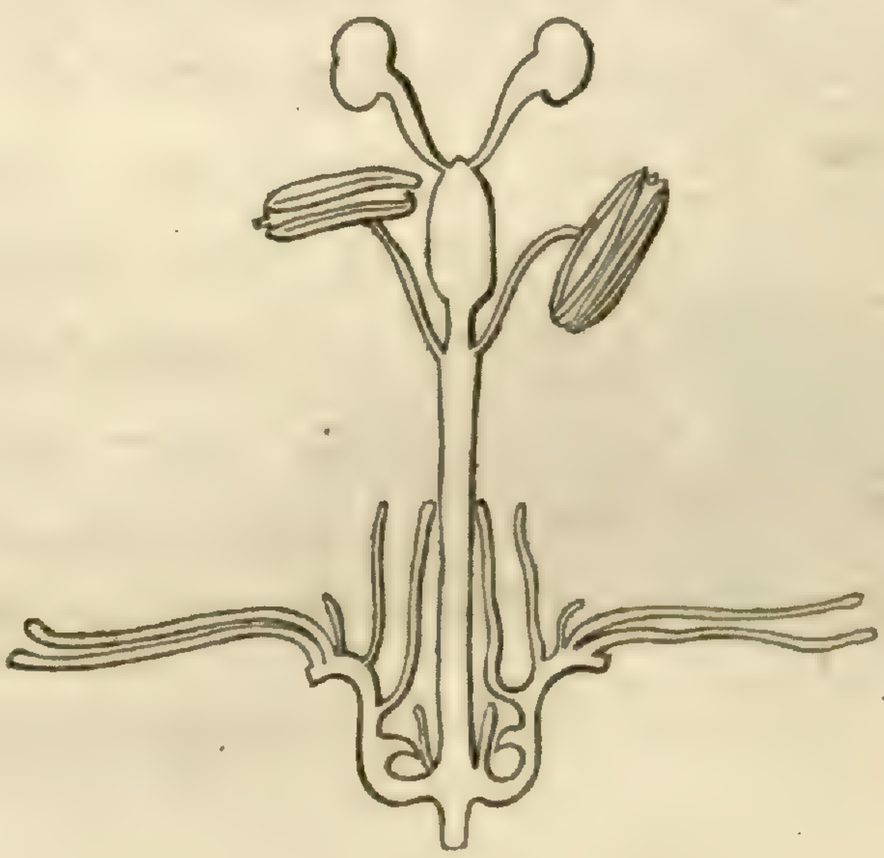
P. racemosa.
THE FEMALE PARENT.

two projections, the lower one short and turned downwards, the upper inclining upwards, and converging to the shaft: from the extremity of this last projection rises a pale green membrane formed into a hollow cone, reaching nearly to the situation of the fourth series of rays, this membrane is pale green, fringed at the top, and slightly tinged with purple.

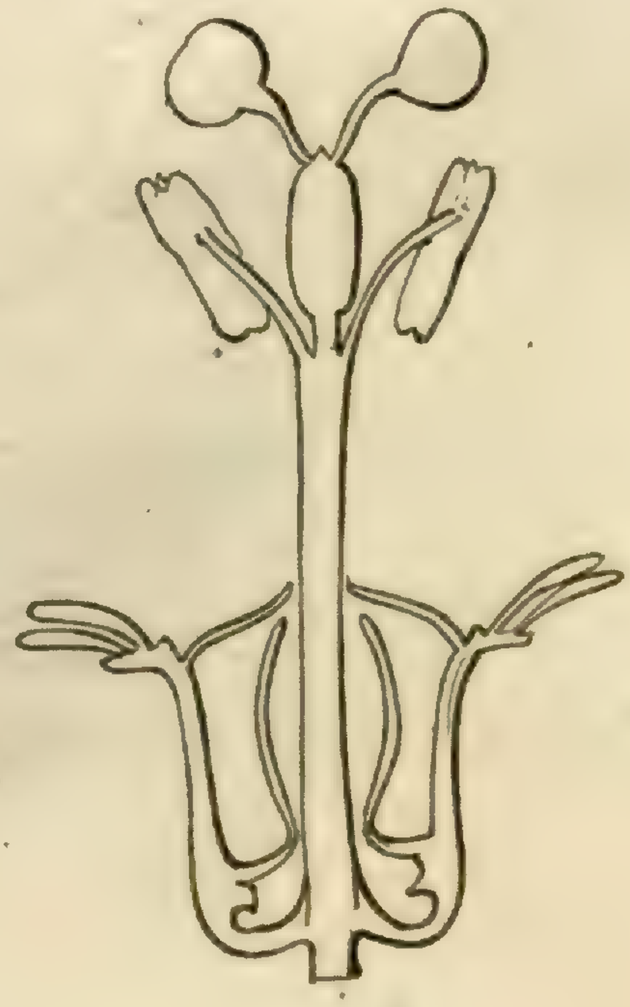
The Shaft two thirds the length of the petals, pentagonal below; round upwards, thin, green, slightly spotted with purple.
Filaments greenish and spotted.
Anthers small, greenish yellow.
Ovary narrow, oblong, slightly glaucous.
Styles pale opaque green.
Stigmas opaque green.



Male.



Hybrid.



Female.

On a comparison of these descriptions it appears that though on the whole the offspring has much of character intermediate between both its parents, yet the resemblance to the female generally preponderates; there are a few points in which the male has stamped its likeness distinctly, and those are striking ones; it is also to be observed that in the flower there are appearances different from that of either parent, and it is singular that these should be what constitute the peculiar beauty of the new plant, as if nature had lent her aid in giving this artificial production, created with the hope of its being an ornament to the garden, a superiority in that part which above all others attracts most of the notice of the cultivator.

The stronger resemblance to the female will be found in the stem, the stipules, the substance and general character of the leaves, the bracteæ (except that they are persistent, as in the male, not caducous, as in the female), and the calyx. The male has had some influence in the shape of the leaves, and in the mode of insertion of the petiole into the leaf; it has quite removed the peculiar inflorescence of the female, substituting its own; and the first and second series of the rays of the crown are almost exact resemblances of the corresponding parts of the male in every point except the colour, which has more of richness and beauty than is to be found in either male or female. This richness of colour is one of the points which I have alluded to as not being derived from either parent, it is not only observable in the hue of all the different series of rays but in the inner surface of the segments of the calyx and of the petals, the colour of both which are so entirey unlike what

before existed in the parents as to give the flower quite a new appearance. Novelties of character are observable also in the third and fourth series of rays of the crown; the first of these are changed from stumps into elongated processes, and the position of the second is altered from that of convergence towards the shaft, to an upright direction. The formation of the tube of the calyx in the hybrid is deserving of attention, though the tube itself is shortened by the influence of the male, yet all the parts within side of it resemble those of the female, with slight variations, except that the extension of the rays from the top of the conical membrane, which add much to the effect of the flower, is not derived from either the male or the female. The stipes or shaft of the hybrid resembles that of the female. The styles and stigmas, as well as the filaments and anthers, are nearly alike in both parents and in the offspring, except in colour, and in that point the two former follow the male and the two latter the female.

I have peculiar satisfaction in thus having laid before the Society the account of this new plant, both as it enables me to give the due credit to the skill of its industrious and intelligent producer, as well as to record, I believe, the first authentic instance of a hybrid production in the genus Passiflora. Had this plant been observed, without a knowledge of the manner by which it was obtained, it would probably have been described as a new natural species; indeed it is not impossible that some of those which have been established as such, may have originated in the same way. The production of plants of a similar description will probably be great hereafter; with one, in a young

state, I am already acquainted; it is a hybrid between P. alata and P. racemosa; the former having produced perfect seeds from impregnation by the latter, in the stove of Mr. CATTLEY, at Barnet, last year, and from these living plants have been raised.

XLIII. *On the Construction of* Piers *and* Copings of Garden Walls. *In a Letter to the Secretary. By the Rev.* Thomas Gery Cullum, *A. M. F. H. S.*

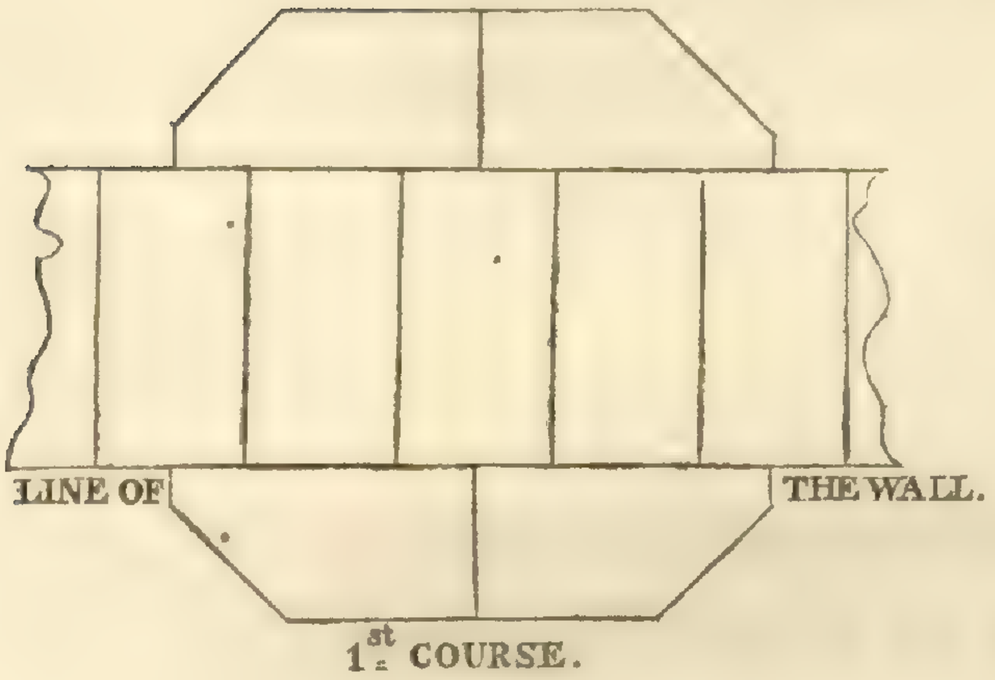
Read, May 2, 1820.

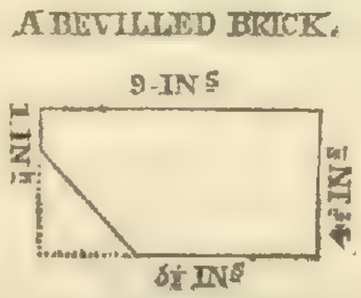
Dear Sir,

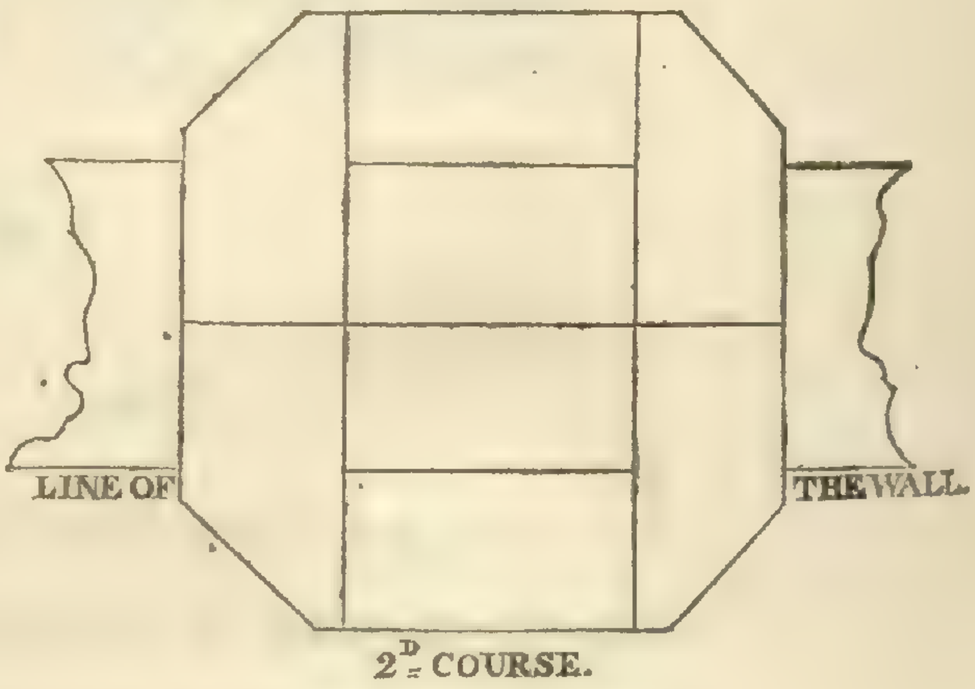
Having recently constructed a nine-inch garden wall, in which it was necessary to have piers at proper distances from each other, to strengthen the work, I made a variation in the *piers* from the usual square form, which I consider to be a considerable improvement; and having also covered the top of the same wall with a *coping*, different from those generally used, I send you the particulars of both for the information of the Society.

Considerable inconvenience arises in training the branches of fruit trees over square projecting piers, on a garden wall, the sharp edges frequently causing them to become gummy, and to canker, in consequence of the injury they receive in passing the angles of the bricks; to remedy this, the piers on my wall are made of an octagonal form, with bricks cast in a mould with the proper bevel, as seen in the annexed sketch, which represents a single brick, as well as two courses of the wall, to shew the manner in which the piers are worked by the bricklayer. No increased charge is made for the bricks at the kiln, nor is there any additional expense incurred in the building of the wall when they are used. The wall, when completed, has a much lighter

appearance, and the branches of the fruit trees are trained with as much facility over the projection of the piers as they are over a flat surface.







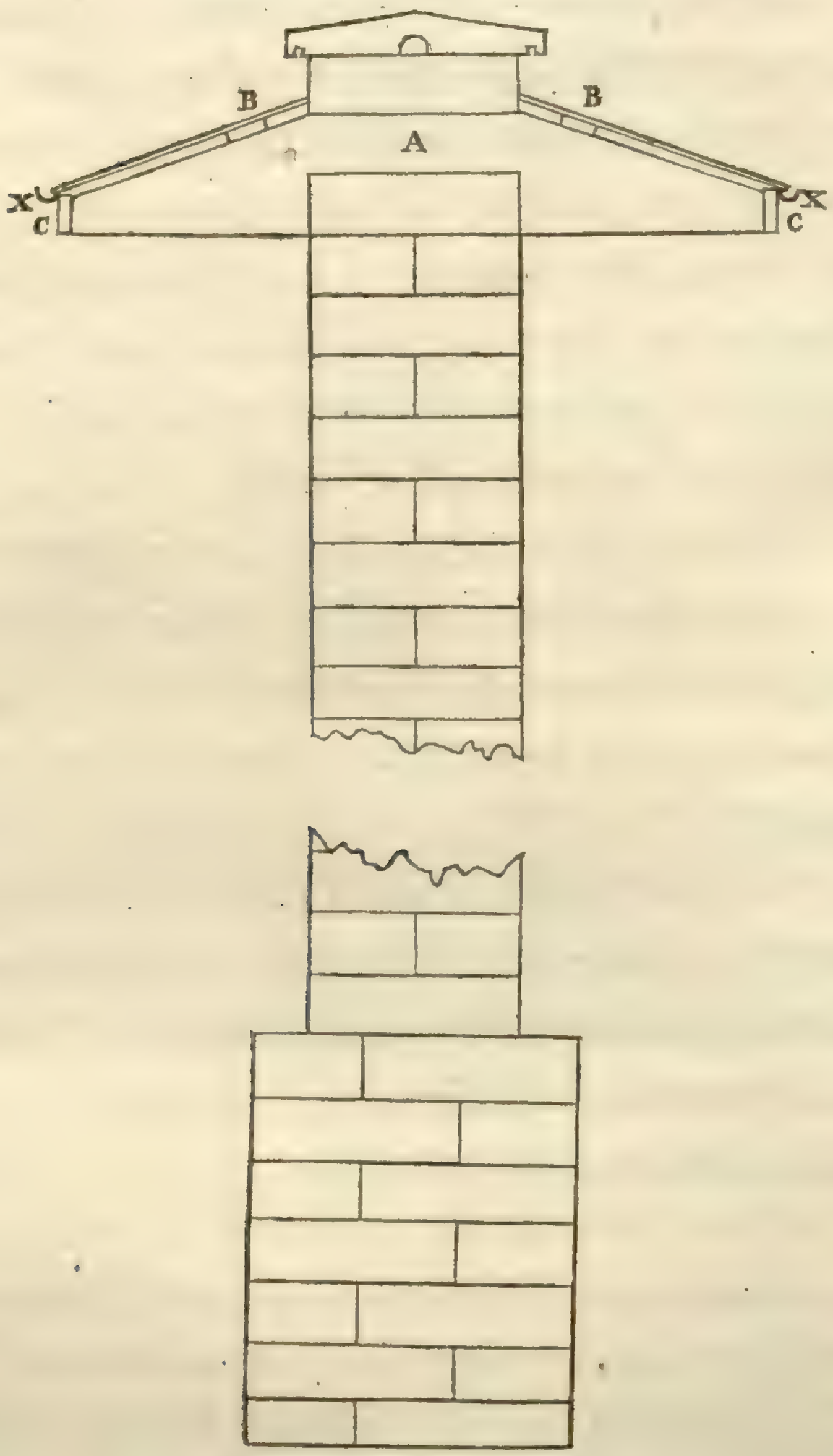
The copings of my wall have a considerably greater projection than is usually given in this country. I was induced to adopt this plan from several circumstances, which I will mention: I have observed that the fruit on clay walls is commonly superior both in quality and quantity; these walls are always finished with a covering of thatch, for their preservation, which projects at least nine inches, and to this circumstance I attribute the abundance and excellence of the produce of the trees trained against them, arising from the ample shelter afforded to their blossoms during the spring season. I have also noticed for many years that a Moor Park Apricot tree, planted to the south-west, under the projecting eaves of a low house adjoining my garden, never failed to produce large crops, without any other protection, whilst the blossoms of my own trees, in the same aspect, were frequently cut off, although guarded by a double netting, my wall having only a projection in the coping of a few inches; and I apprehend that the difference of success in

these two causes could only arise from the difference in the width of the respective projections above them.

In the Peach gardens at Montreuil near Paris, a projection of four or five inches is universally adopted; and the Comte LELIEUR, the author of *La Pomone Françoise*, attributes the failure of the crops of Grapes and Peaches in the vicinity of Paris, more to the want of sufficient projection in the coping than to any other cause. In page 78 of the work he remarks, that the copings to all the walls of the gardens in the neighbourhood of Paris have little or no projection, while those of Thomery* have a projection of ten or eleven inches over walls which do not exceed eight feet in height.

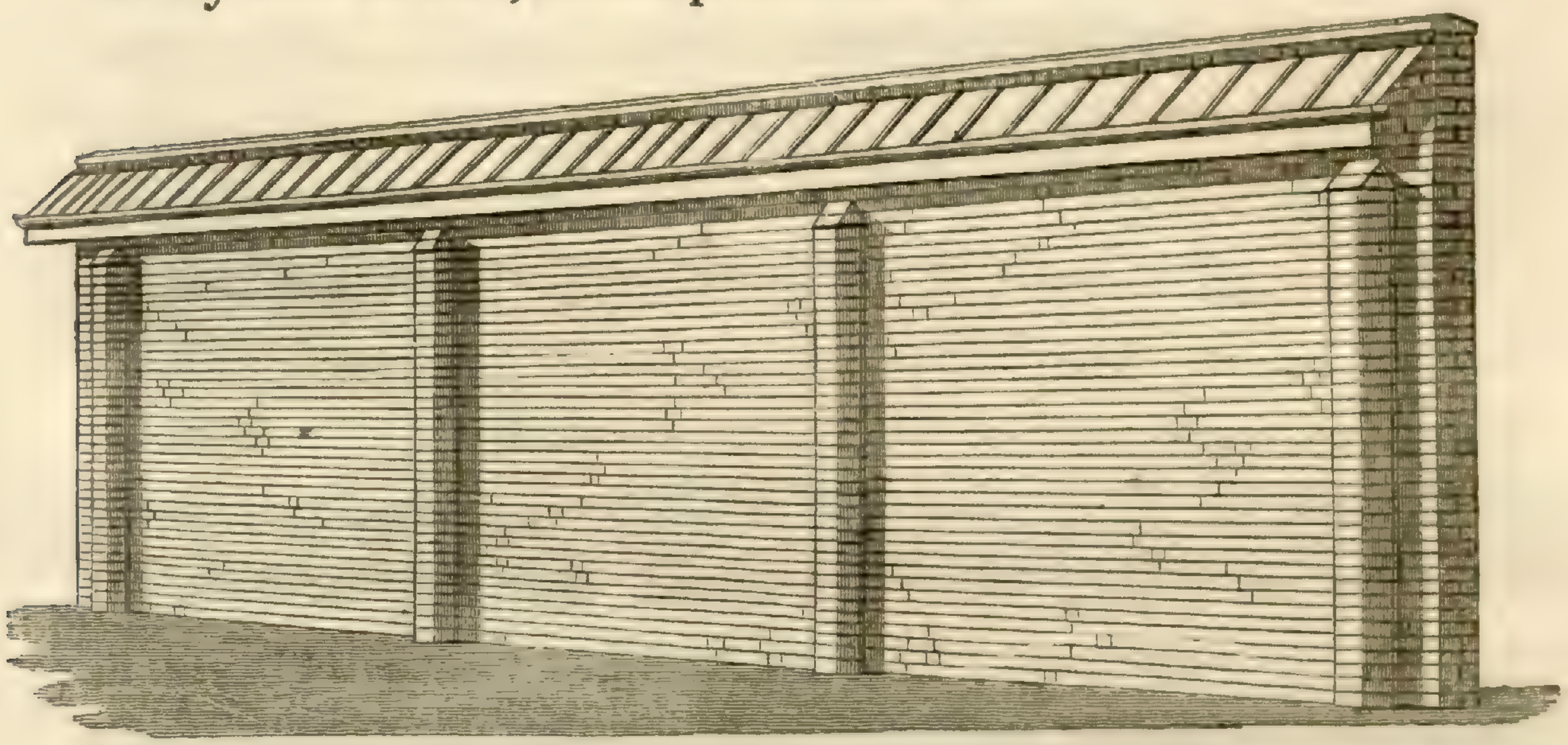
Induced by all these considerations I resolved to try the experiment of a projection of nearly a foot in my new wall, which has fully answered my expectation. I have annexed a section of the wall, which I hope will make the following explanation sufficiently intelligible.

* Thomery is a village near Fontainebleau, where the finest Grapes are chiefly grown, and which are so well known in the Paris markets as Les Raisins de Fontainebleau. The success of the inhabitants of Thomery in the cultivation of Grapes upon these low walls with projecting copings, is well described in the work above quoted.



Brackets of seasoned oak or pitch pine (A) are built into the wall at eighteen inches apart from each other; on these are nailed laths (BB), to which slates are fastened; in front of the brackets, under the slates, are facia boards (CC) to give a neat finish to the work, and the water which runs from the slates is carried off by a small copper gutter (XX), to prevent the fruit at the lower part of the wall from being splashed. The foundation of the wall is a brick

and a half thick, as represented. The slates I have used are called *Dutchesses;* they are one foot broad, and on an average, two feet long. Over each joint (as may be seen in the general view of the wall annexed) a ribbon of slate, three inches wide, is bedded in putty, and fastened on by two screws, to keep out the wet.



General appearance of the Brick Wall, with its coping, trough, and piers.

In situations where only one side of the wall is to be used, half brackets may be mortised into bond timber built into the wall, in order to support the slates. One course of brick work is carried above the level of the slated covering, and the usual coping of stone, or saddle brick, as represented on the top, preserves the wall from damage of the weather from above.

I am, dear Sir,

yours faithfully,

THOMAS GERY CULLUM.

Hardwick House,
Bury St. Edmunds,
29th April, 1820.

XLIV. *Description of some Varieties of* Pears *and* Apples *received by the Society in the same Seasons of* 1818 *and* 1819, *from Mr.* Louis Stoffels, *of Mechlin, in Flanders, Corresponding Member of the Society. By Mr.* John Turner, *Assistant Secretary.*

Read, October 17th, 1820.

The several collections of *Pears* and *Apples* which the Society has received in the two last seasons from their very valuable Correspondent, Mr. Stoffels of Mechlin, appeared to contain so many excellent varieties not known, or at least not cultivated in this country, that I have thought a particular account of such of them as can be accurately described would not be unacceptable; the more so, as grafts of most of these have already reached this country.

Of the decided superiority of the new sorts of Flemish Pears over those both of France and England the Society has had frequent opportunities of judging. I am disposed to think that this superiority is not to be attributed in any great degree to the soil or climate, as some have supposed, but to the spirit which has long prevailed in Flanders, of raising new varieties in great numbers.

Among those cultivators who have most distinguished themselves in this pursuit was the late Comte de Coloma of Mechlin, who, during a very long life, was indefatigable in adding to the stores which his country previously possessed. To Dr. Van Mons, the present Professor of Chemistry and Rural Economy at Louvain, the lovers of horticulture are

not less indebted. His garden, at Brussels, has furnished specimens to the Society, in the course of several seasons, which have excited much admiration, and grafts have been liberally supplied from thence, very great numbers of which have been worked in the Society's garden, as well as in those of many private persons; and some of the plants which have already fruited sufficiently show that the climate of the south of England is little less favourable to the growth of this valuable fruit than that of the Netherlands.

The specimens of Pears and Apples sent by Mr. Stoffels have not been selected from the produce of his own garden only, but from those of the Comte de Coloma and others: the selections, however, have been made with so much attention, that grafts of all the approved sorts, not already received, will be easily obtained by the Society.

In the following lists the fruits are arranged, as nearly as I could judge, in the order of their ripening, and the characters of the trees are given from information communicated by Mr. Stoffels.

Pears.

Sabine d'Eté. Raised in 1819, and named by Mr. Stoffels in honour of Mr. Sabine. The form is pyramidal, broadest at the eye, and tapering to a round blunt point at the stalk: the whole surface uninterrupted by any fold or projection, and perfectly smooth and polished. Colour, yellow on the shaded side, heightened into a fine scarlet on the side exposed to the sun, minutely dotted. The eye small, not deeply inserted. Stalk rather fleshy, an inch long, inserted in a very shallow basin. Flesh white, or nearly

so, melting, juicy, and highly perfumed. Ripens in the beginning of August; will not keep. The wood of the tree is slender, but bears abundantly.

Seigneur d'Eté. A variety of the Poire Seigneur. This has been known many years in Flanders. It is a blunt oval, above the middle size, of a fine orange colour, with bright scarlet on the exposed side; sprinkled with small brown spots, and partially marked with larger spots of the same colour. Flesh melting, free from grit, with an extremely small core. A rich and very beautiful Pear. Ripens in the beginning of September. The tree is handsome, and bears well.

La Bonne Malinnoise. Raised by M. de Nelis of Mechlin, a variety in some degree resembling the Chaumontel; but superior to that, as produced in this country. It ripens about the middle of November. The tree has much the character of the Chaumontel, and is a tolerable good bearer.

Poire d'Ananas. This has been known in the vicinity of Mechlin some years. There is a Pear described in Knoop's *Pomology*, page 78, under this name, but different from the present variety. It is of the middle size, very handsome, melting flesh, with a fine Pine Apple flavour. Ripens about the middle of November. This Pear is highly esteemed in Belgium, where it is considered one of their very best sorts. The tree is dwarf in its habit, flowers freely, and at the extremities of the branches.

Glout Morceau. The origin of this Pear is not known, but it is considered by the Belgians as the best melter they have. It is large, and nearly round, very juicy, and high

flavoured. Ripens in the end of November. The tree is of vigorous growth, making strong thick shoots; but it is very liable to canker in some soils.

Princesse d'Orange. This was raised by the Comte de COLOMA in 1802. It is of the middle size, resembling a Bon Chretien in shape, but shorter. The skin is of a clear yellow colour, with bright scarlet where exposed, and sprinkled with brown spots. Flesh rather gritty, but very juicy, and resembles in flavour the Bon Chretien d'hiver; an excellent Pear. Ripens in December. There is a Prince d'Orange, a large Pear, nearly resembling this, but very inferior.

Rose dorée. Large and round. Skin of a greenish yellow colour profusely sprinkled with brown spots. Flesh white and crisp, with a very sweet juice. Better fitted for compôtes than for the table. Ripens in January. This variety is known principally in the neighbourhood of Antwerp. It is different from the Poire de Roseau, described by KNOOP and other Pomologists.

Double Krÿgs Poire and *Petit Krÿgs Poire.* The only difference between these, is in the size, they being both alike in form, colour, and flavour: the difference in size is, however, uniform on the respective trees. They were raised some years since at Maasijk, where there is now a very large tree of the first sort. Their form somewhat resembles that of the St. Germain, but is a little longer, and the largest is about the size of a well grown St. Germain. The skin of both is yellow on the shaded side, and with a blush of dull red on the side exposed to the sun. The flesh is yellowish, not very juicy, but sweet, and very high flavoured. The small one is a valuable winter table Pear, and the

larger has few equals for culinary purposes. The small variety is preferred in Belgium, on account of its being the best bearer.

Apples.

Haus Mutterche, or *Mère de Menage*. Some of the specimens of this Apple measured fifteen inches in circumference. It is globular in form, flattened considerably; of an unusually deep red colour. The flesh is soft, and soon becomes woolly, but even in this state it has few superiors for culinary purposes. The tree is irregular in form, vigorous in its growth, and an excellent bearer. It is abundant in the country round Munster in Germany.

Bellefleur d'Eté. Closely resembling the Ribston Pippin in shape, colour, and size. It is an excellent Apple, but a shy bearer, and is therefore only to be met with in large collections.

Bellefleur longue. Above the middle size. Pearmain shape. Skin yellow, with a faint blush of red, and a few slight stripes of the same colour on the exposed side. The flesh is tender, with a very sweet pleasant juice. This variety is universally cultivated in Belgium on account of its excellent qualities. It is a great bearer, and keeps well till February.

Cortice Striato. Oval, of the middle size. Skin yellow, very delicately striped with red; an unusually handsome Apple, and of good quality. The wood of the tree is very remarkable, and has given the name to the fruit. It is of a clear brown, longitudinally striped with bright red in the most regular manner. It is a native of Holland.

Nouvelle Reinette dorée, ou Pomme Knight. This was raised by M. VILANFAGNE, a friend of Mr. STOFFELS, who wished to have it named in honour of the President of the Horticultural Society of London. It has nothing of the Reinette in its appearance, being a large globular Apple, diminishing very little towards the eye. It is covered with bright russet, without mixture of any other colour. The flesh is firm, rich, and highly flavoured.

Pomme de Wijneghem. Shape of a Nonpareil, but much larger. The skin yellow, broadly striped with red, and a little russetted round the stalk. The flesh yellowish, melting, with a rich sweet juice in great abundance.

Court-pendu plat Rougeâtre. More flattened than the yellow Court-pendu, which is common in the English gardens. The red variety is remarkably regular and handsome in form. The eye is placed in a very large even cavity; the stalk, which is unusually short, is deeply inserted. The skin is a dull yellow on the shaded side, and very bright red where exposed, through which appear a few small yellowish spots. The flesh is yellow, very close at the core, firm, and crisp, with abundance of rich sweet juice. A remarkably handsome and excellent Apple. This variety is found in great abundance in the neighbourhood of Maasijk. There is a small variety of this, differing in nothing but the size from that just described.

Bellefleur Oblongue. A large conical Apple of very great excellence for culinary purposes. The skin is pale yellow, partially striped with red. It was raised from seed at Maasijk. It does not differ much from the Old Bellefleur figured in

Poiteau's Duhamel, which is amongst the most valuable Kitchen Apples, whether its flavour or keeping qualities be considered.

XLV. *Description and Account of the Varieties of* Double Scotch Roses, *cultivated in the Gardens of England. By* Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read, November 7th, 1820.

Amongst the modern additions to the ornaments of our gardens, the varieties of *Double Scotch Roses* stand deservedly very high in estimation; their beauty is undisputed, and as they come into flower* full three weeks before the general collection of garden Roses, they thus protract the period of our enjoyment of this delightful genus. On the British collector's notice they have an additional claim, being almost exclusively the produce of our own country; for of the many kinds that I have observed there are only three which can by any possibility be supposed to have originated out of Great Britain.

The Scotch Rose has been, and still is, sometimes called the Burnet Rose; it is the Rosa spinosissima of the English authors† of authority who have written on the genus: they have united the Rosa pimpinellifolia and the Rosa spinosissima of Linnæus, treating them as the same species, and not even separating them as varieties. Willdenow, how-

* The earliest varieties open before the end of May, and the succession of blossoms on the different plants is kept up till near the end of June.

† See Sir James Smith, article *Rose*, in Rees's *Cyclopedia*; Woods, in *Transactions of the Linnean Society*, vol. xii. p. 178; and Lindley *Rosarum Monographia*, p. 50.

ever, in his *Species Plantarum*,* has adhered to LINNÆUS's distinction, in which he seems to be supported by JACQUIN, in his *Fragmenta Botanica*; MILLER also, in his last edition of the *Gardener's Dictionary*, has kept them separate. The Rosa pimpinellifolia is the small wild, or (what I consider) the True Scotch Rose, with very small leaves, generally with smooth peduncles, and a flower, (with very few, if any, exceptions,) more or less tinged with red; this is the Rosa Scotica, or Dwarf Burnet-leaved Scotch Rose of MILLER; and it is figured by JACQUIN as Rosa pimpinellifolia.† The Rosa spinosissima of LINNÆUS, of WILLDENOW, and of JACQUIN,‡ has larger leaves, peduncles armed with small spines, and large white flowers, usually without any tinge of red; this MILLER calls Rosa spinosissima, or the Burnet-leaved Rose. I do not mean to question the propriety of considering them as the same species, but they are, assuredly, so different from each other, that they ought to have been treated as varieties; and when all the plants usually called Scotch Roses are brought together, the Rosa pimpinellifolia above alluded to must be considered as the type of the species, for, if they have all been derived from one stock, I apprehend that was the original parent; for which reason if I were writing an account of the genus, or treating on the particular species, I should certainly adopt *pimpinellifolia* as the specific name.

The True Scotch Rose in its perfectly natural state, is well known; growing abundantly on a dry soil, but more

* Vol ii. p. 1067. No. 7, and 8.

† See JACQUIN *Fragmenta*, 71. tab. 107. fig. 1.

‡ See JACQUIN *Fragmenta*, 79. tab. 124

plentifully in the northern than the southern parts of the kingdom. Its general character is a compact, bushy shrub: low when in a wild state, but in gardens, though it begins to flower when very small, it grows to three and four feet, and even higher, extending widely at the base: some of the varieties are however more dwarf than others. The branches are very numerous, thickly covered with aculei of various sizes, some being larger, others smaller, and some like fine hairs or setæ; the larger aculei of the root shoots are frequently recurved, and have a falcate or hooked appearance; the lower parts of the stronger ones are often very much dilated. The leaves, on the greater number of the branches, have, for the most part, three pairs of foliola; but on the surculi, or strong shoots which arise directly from the roots, they have usually five pairs in the first year. The petioles are almost always smooth, though, occasionally, they produce some scattered hairs; and a few aculei as well as small glands, are also sometimes found upon them. The foliola are small, elliptical or nearly round, with simple serratures, of a deep and opaque green above, paler underneath, and quite free from pubescence on both sides. The flowers come out singly, in great numbers, along the whole length of the branches, standing erect, and not nodding;* the peduncles are smooth, though not uniformly so, in wild as well as cultivated specimens, some are covered with setæ; even the same plant is liable to vary in this particular, and the variation is more considerable in some of the double

* In some of the double varieties the weight occasioned by the increased number of petals causes the peduncle to bend, and consequently their flowers are pendulous.

flowering sorts. The germen* is generally globose, but in several double varieties it becomes flattened, swollen, and somewhat campanulate, owing to the enlargement arising from the impletion of the flower. The leafits of the calyx (now called sepals) are quite simple, that is, without small leaves or pinnæ on their sides, but have generally a leavy termination, more or less elongated ; when the flower opens they become reflex, and more so in the double than in the single varieties.

The single flowers of the True Scotch Rose are cupped at first, but subsequently the petals become more expanded ; the bud, before it opens, commonly shews a bright colour ; the base or claw of the petals, whatever be the general colour of the flower, is usually white or greenish yellow. The scent, though very agreeable, is not so strong or fine as in many other Roses. The fruit is round, or nearly so, differing in size in the different varieties ; it is dark coloured, becoming, when ripe, quite black, but in some plants it is of a deep reddish brown.

The Double Scotch Roses are more especially the object of attention with ornamental gardeners. They are nearly all strictly referable to the True Scotch Rose, or Rosa pimpinellifolia above mentioned, for the variations from the type, in foliage, and mode of growth, are very trifling in most of them ; the chief difference between them is in the

* For the sake of conciseness I shall call that part which afterwards becomes the fruit, the germen, as it used to be so denominated ; in later times it has been a question whether it ought to be considered as the dilated receptacle of the flower or the tube of the calyx, and it is thus differently described by different writers.

colours, and the impletion of the flower. The older books on gardening make no mention of any varieties of Scotch Roses; even the last edition of MILLER's *Dictionary* does not notice any double one. In the second edition of the *Hortus Kewensis*, though the list there given of the cultivated Roses is large, not more than six varieties of the Scotch Rose are mentioned, only one of which is double, and that even is not properly a Scotch Rose; so that they are, in fact, altogether new subjects to a writer.

The first appearance of the Double Scotch Roses was in the nursery of Messrs. DICKSON and BROWN (now DICKSON and TURNBULL) of Perth, between twenty and thirty years since. I am indebted to Mr. ROBERT BROWN, one of the partners of the firm at the above period, for the following account of their origin. In the year 1793, he and his brother transplanted some of the wild Scotch Roses from the Hill of Kinnoul, in the neighbourhood of Perth, into their nursery garden: one of these bore flowers slightly tinged with red, from which a plant was raised, whose flowers exhibited a monstrosity, appearing as if one or two flowers came from one bud, which was a little tinged with red: these produced seed, from whence some semi-double flowering plants were obtained; and by continuing a selection of seed, and thus raising new plants, they in 1802 and 1803, had eight* good double varieties to dispose of; of these they subsequently increased the number, and from

* As nearly as I have been able to ascertain, the eight sorts were the *small white*, the *small yellow*, the *lady's blush*, another *lady's blush with smooth footstalks*, the *red*, the *light red*, the *dark marbled*, and the *large two-coloured*.

the stock in the Perth garden the nurseries both of Scotland and England were first supplied.

In Scotland, Mr. Robert Austin, of Glasgow, a corresponding member of the Society (of the firm of Austin and M'Aslan, nurserymen in Glasgow), about fifteen years since obtained the varieties from Perth, and has since cultivated them to a great extent, having now in his collection upwards of one hundred different new and undescribed sorts, some of which, perhaps, when compared with the best now cultivated, may not be deserving of particular notice; but many are of such beauty, and so decidedly distinct, that, when made public, they will greatly increase the catalogue of these ornamental plants.

In England, Mr. William Malcolm, of Kensington, in the year 1805, purchased from the Perth collection six of their original sorts, and subsequently obtained the two others. They had been sold before that time to several noblemen and gentlemen, who were customers of Messrs. Dickson and Brown. Messrs. Lee and Kennedy, of Hammersmith, received the first of their stock from Mr. Drummond Burrell, now Lord Gwydir, who brought them from Perth, and their collection was afterwards encreased by purchases from the same quarter. The same kinds have since been also obtained by Messrs. Whitley, Brames, and Milne, of Fulham. But, though the above three collections are by far the most complete of any, yet more or less of all the varieties are to be found in the other nursery gardens near London. Mr. Lee has lately raised, in his ground at Bedfont, beyond Hounslow, a great variety of seedlings, possessing extraordinary beauty; they attained a size fit for observation

only in the present year, but I was not so fortunate as to be able to visit them when in blossom; I have, however, seen specimens of their flowers; and from these I conceive that many of the plants will assimilate with kinds before known; though several are very different, and will become important additions to general collections.

I have for many years collected the Scotch Roses with considerable attention; and the plants which I describe in this Paper have, with very few exceptions, flowered, and been examined by me, in my own garden. Four years ago I began to prepare my notes upon them, with the intention of laying them before the Society. Each succeeding season has certainly added something to my information respecting these plants; but I consider the time which has elapsed, since I entered on the subject, as employed rather in confirming my first observations, than in very essentially increasing my knowledge of the varieties.

My arrangement of the Double Scotch Roses has been formed in sections, founded on the general colour of the flower; the plants which are placed under each section having still sufficient difference of character to distinguish them decidedly from each other. This arrangement will enable those persons who may wish to make small collections, to select one or more from each section, by which means they will obtain the most prominent differences in a very small number of plants. Another very important advantage arising from the classification by the colour of the flowers, will be, that whenever any new variety is raised, and established as worthy of distinction, its place in the arrangement will be assigned with ease. I have in many cases preferred names founded on the colours of the flower, to designations of mere fancy, which

give no aid to classification or description, and are therefore very objectionable.

Of the DOUBLE WHITE SCOTCH ROSES I have four distinct kinds.

The Small Double White is a plant of moderate size. In its flowers the peduncles are small and thin, the germen semi-globose, and the sepals narrow; the bud shews itself of a greenish white colour, with a slight crimson tinge; the expanded flower is not large, more than semi-double, with small petals in the centre, the claws of which being yellow, they give a tinge of that colour to the middle of the flower. As the flower decays, the petals lose their regular arrangement, and become apparently broken. The fruits, when ripe, are black and globose, but not abundant. This is rather an indifferent variety as to beauty, but it blossoms freely, the flowers opening about the middle of the season of the Scotch Roses. A bad representation of it is given in ANDREWS's *Roses*, under the name of R. spinosissima nana, or Dwarf Thorny Rose.

The Large Semi-double White is a strong growing plant, with large and broad aculei on the branches. The peduncles are short and thick, bearing setæ; the germen is flatly campanulate; the sepals are short; and the whole of these parts have a mahogany coloured tinge. The bud is large, much swollen, and stained with brownish red; the flower is semi-double, expanding well; the petals are large; the stamina are very apparent; and the styles are thickened, and appear as if the centre of the blossom would become proliferous, which is often the case with Double Roses. The fruits are black, rather compressed, and few in number. This sort flowers late, and the blossoms occasionally fail, but those which do

open are very fine. It appears in the older French catalogues under the name of the *Double Pimprenelle Rose*, and has been recently figured and described in REDOUTE"s *Roses*,* as *Rosier Pimprenelle blanc à fleurs doubles*; where the credit of its origin is given to M. DESCEMET; and it is said to be now usually called in the French nurseries, the *Rosier pompon blanc*.

The Large Double White. The peduncles are long and thin, the germen campanulate, and the sepals triangular; the bud is thick and white; the flower is large and quite double, with a finer scent than usual. The plant grows very strong, so that the leaves on the surculi have six pair of foliola, the lower of which do not grow opposite. I observed it in 1819, in Mr. LEE's nursery at Hammersmith, where it flowered for the first time, having been imported from France.

Whitley's Double White. The peduncles are moderately long, thick, and covered with strong setæ; the germen is very much flattened; the sepals are triangular, short, and broad; the bud is large, and greenish white, with a dash of dark red; the flower is very large, opens early, is semi-double, and expands freely, shewing the yellow claws of the petals conspicuously; the stamina are very apparent, and the styles are thickened and enlarged. The fruits are not numerous, they are large, black, and globose, but rather flattened, and so much opened at the top as to shew the seeds. This sort was raised from seed of the small Double White, by Mr. WHITLEY, in his late nursery at Brompton, about ten years since; it is a very fine variety, of more

* Vol. ii. p. 99.

vigorous growth and habit than usual, but still a True Scotch Rose. The aculei on its young branches are sometimes very red.

Of the DOUBLE YELLOW SCOTCH ROSES there are only two which I can recommend to particular notice, though there are others which I shall mention.

The small Double Yellow has peduncles long, thick, and smooth, but sometimes partially hispid; germen campanulate; sepals small; the buds have a tinge of green, and in places a slight stain of red. The flower is small, opens well, and is rather fuller than semi-double, having some small petals mixed with the stamina. The fruits are dark red, somewhat compressed, and not abundant. The colour of the flowers is a pale sulphur, rather than a yellow, which latter term raises a false expectation of beauty. The variety, however, is very excellent; it flowers about the middle of the season, and is not of strong growth. It is figured by ANDREWS in his *Roses* as *R. spinosissima sulphurea*.

Amongst a collection of Double Scotch Roses, which I received some years since, from my late friend, Mr. GEORGE ANDERSON, was *The Pale Double Yellow*. This agrees exactly with the preceding in general characters; but its peduncles are hispid, and the flowers are paler, so much so, that they may easily be mistaken for white.

The other superior variety which I allude to above, is, *The Large Double Yellow*. It has long and thick peduncles, bearing strong red setæ; the germen is nearly flattened, and the sepals are narrow; the buds are of a dingy sulphur colour, with a tinge of red which is preserved in a few slight spots of that colour on the outer petals, after the bud expands;

the flower is larger than that of any other Scotch Rose I am acquainted with, except WHITLEY's Double White; it is semi-double, and of a much deeper colour than the Small Double Yellow. The petals are large, and expand freely; the stamina are particularly conspicuous and strong; the styles are swollen and lumpy. The fruits are few, but large, widely expanded at top, globose, and black. I received this kind from Mr. WILLIAM MALCOLM of Kensington; it flowers later than most others, and its blossoms are very splendid, but sometimes they do not open well. It is a vigorous grower, becoming taller than most others, and the aculei on its branches are particularly strong and large.

Approaching to this is another variety, of a plant which I found in the Hammersmith nursery, where it was called the *Globe Double Yellow*: but as it rarely opens its flowers well, it does not deserve cultivation. It is distinguished from the preceding kind by its peduncles being quite smooth.

Of the DOUBLE BLUSH SCOTCH ROSES I have seen several which are not sufficiently distinct from those here noticed, to deserve being separately described. Those which I shall enumerate I consider essential to a perfect collection.

The Princess Double Blush. This may readily be mistaken for the Small Double White, which it greatly resembles; but it differs in the flower, being better cupped, and more evenly shaped; in many of its flowers, at their first opening, there is a slight suffusion of blush. In some specimens the outside petals are blotched with crimson, and have more blush than the inside of the flower. It does not produce fruits generally. It is a neat Rose, blossoms early, and is not of

strong growth. I found it in Mr. LEE's garden at Hammersmith, with the name of *The Princess*, which I have preserved.

The Double Lady's Blush. In this the peduncles are thick, of a moderate length, and covered with setæ; the germen is thick and semi-globose; the sepals long and narrow; the buds are of a very pale flesh colour; the flower opens of a very delicate pale pink or blush, which, by exposure to the sun, becomes gradually white; the petals are large, with a few slight dashes of red, like small lines or stripes, occasionally observable in them, their backs are always so pale as to approach nearly to white; the flower is fuller than semi-double, expands well, is cupped, and particularly beautiful when it opens. The fruits are few, black, and not large, with a slight opening on the top. The plant grows strong and tall, comes early into blossom, and bears a profusion of flowers. This was one of the first double varieties raised, and is, perhaps, the most generally known, its beauty being particularly attractive. I do not think that any new variety possessing the same character of opening with a blush and going off white, is likely to be superior to it in all points of excellence.

The next in my collection is *Anderson's Double Lady's Blush*, which was given to me by the late Mr. GEORGE ANDERSON. It has long and thin peduncles, some bearing a few setæ: others being quite smooth; the germen is globose; the sepals are long and narrow; the bud is pale, and in opening shews a rich pink; the flower is large, expands well, is flat, and not cupped; it is perfectly semi-double, having no small petals mixed with the stamina; the petals

are deeply notched; they are of a rich blush colour, but fade off entirely white. The fruits are of moderate size, black, and compressed. It comes into flower later than the Common Lady's Blush.

*The Dutch Double Blush** has been so called in my catalogue, because it appears to have been introduced into our nurseries from Holland, where it is called *Rosa spinosissima flore pleno*. It is a stronger growing plant than many others; its aculei are dark red, the larger ones thin, and much flattened. It has generally four pair of foliola even on the leaves of its flowering branches; the foliola are large; the peduncles are long, thickened, and quite smooth; the germen large and campanulate; the sepals long, narrow, and leafy; the bud shews a delicate pale blush; the flower is large, semi-double, and expands well; the petals are large, rather turned back, thin and semi-transparent, with a faint blush pervading the whole of them, both within and without, but it is more intense in the centre; the whole colour goes off on exposure to the sun; the general tinge is deeper than in the Lady's Blush, and the flowers open some time after those of that variety. The fruits are abundant, inclining to

* I apprehend, that the Rosier Pimprenelle rouge à fleurs doubles, of REDOUTE's *Roses*, vol. i. p. 119, is this plant; the figure represents the peduncles as having setæ, but they are described to be occasionally smooth. The French Rose is represented to have been raised by M. DESCEMET, and to have been subsequently nearly lost, and only preserved by accident, and that it was also observed in Messrs. LODDIGES's garden at Hackney. Messrs. LODDIGES's plant is certainly the one I have described, and that came from Holland, not from France. The observations on this Rose in the work alluded to are remarkable in shewing the want of information of the writer; who seems to be entirely ignorant of the existence of any other Double Scotch Roses than this and the white one mentioned above in p. 289.

dark red rather than black, compressed, and open at the mouth.

The Double Provins Blush belongs to the section of the Blush Scotch Roses; it is a sort very generally known, growing tall and strong, and coming early into blossom. It originated I believe in the Perth nursery. The peduncles are thick, long, and quite smooth; the germen is full, large, and campanulate; the leaves of the calyx are broadly triangular, with a long pointed leaflet at the end, and expand widely: the whole are tinged with a mahogany colour. The bud is of a very pale pink, or rather a dingy white; the flower is particularly large and double, of a delicate flesh colour, deeper than the Lady's blush, and more glowing in the centre; it is cupped, and well shaped, the centre petals being smaller than the outer; the scent is fine, more like that of a Provins Rose than a common Scotch Rose. It bears but few fruits; they are large, black, and globose, with slightly expanding tops. The whole flower has a character different from all the others, and when it opens well is peculiarly handsome; but the buds occasionally fail, and do not expand, in which case the flesh colour becomes dull and of a smoaky hue, the buds then continue closed, and in that state decay.

The Double Pink Blush. This was obtained from Mr. George Anderson, who procured it from Scotland. I have never observed it in the nurseries. It is one of the earliest in blossom; it has thick and short peduncles armed with setæ, and a semi-globose germen. The bud is pink; the flower semi-double, and not large; the petals are of an uniform pink, or flesh colour, which pervades the whole,

except the claws, the backs are somewhat paler; the colour goes off a little after the flower has been some time opened; but it does not become ultimately white. The fruits are numerous, black, and compressed.

The Double Rose Blush. I received this from the Hammersmith nursery as the *Light Red*, which name is quite unsuited to it. Its peduncles are long, thick, and smooth; the germen full and campanulate, the leaves of the calyx short and broad. The flower is particularly full-double; it does not expand much, but is cupped, having the petals arranged closely together; they are of a fine rose colour, but differ from those of all the other kinds in having a deeper hue on their edges than in any other part; the backs of the petals are quite pale. It does not produce fruit. This is one of the latest of all the double Scotch Roses in flowering, and it is very unproductive of flowers, for they seldom open fairly, though, when well blown, they are particularly handsome, and have a very delicate scent, much resembling the finest rose-water. I apprehend it is this variety which Andrews has figured in his *Roses*, under the name of *R. spinosissima carnea*.

My next section contains the plants usually sold in the nurseries under the name of Double Red Scotch Roses: of these there are many, as in the other sections, with slight shades of difference; but I make only three distinct varieties.

The first I consider as the *True Double Red.* It has its peduncles short, sometimes smooth, sometimes slightly hispid; the germen is small, and semi-globose; the leaves of the calyx are small; the bud has but little colour; the

flowers are middle-sized ; expand well ; and the petals, which are much notched, are somewhat reflexed, a circumstance which gives additional beauty to the flower ; the inside of the petals is a fine rose colour, sometimes slightly mottled, becoming gradually paler as it approaches the edges, where it is nearly white ; the claws shew much yellow, and the outside of the petals is very pale. This is a very beautiful Rose ; it grows tall, flowers plentifully, and opens early. The fruits are abundant, large, black, and compressed. The aculei on the branches are rather stronger than usual in Scotch Roses, they are much expanded as well as flattened at their bases ; but I have another plant which produces flowers similar to those here described, in which the aculei are not so strong.

The Double Light Red is also an early variety, blossoming soon after the Double Red. Its peduncles are generally smooth, but sometimes there is a slight hispidity on them ; the germen is semi-globose, and the sepals rather long ; the buds shew but little colour, and the flower, when opened, is more cupped than that of the preceding, and less brilliant in its colour, which, instead of being purely rose, is tinged with a purplish hue, and the whole is paler ; the petals, when opened fully, have rather a confused appearance, and shew much of their pale backs. The fruits are black, few in number, small and globose, with a slightly extended neck. This Rose has much affinity to the Light Marbled in the next section ; it might, without impropriety, be called the *Pale Purple Red*, but the name under which I have described it seems generally to have been attached to it in the nurseries.

The Double Dark Red has short, thick, hispid peduncles,

semi-globose germens, and small sepals; the buds are pale; the flower, when blown, is well cupped; it is more than semi-double; the whole of the inside of the petals is of a dark rose colour, rather inclining to lake; the back of the petals have an uniform pale purplish hue, as if the inside colour were seen through the substance of the petal, they are also reticulated with veins. The flower is good, and though not so handsome as the first sort, is still excellent; in going off it becomes marbled, and the edges of the petals are ultimately blanched, as in the two others. The fruits are small, not numerous, black, and globose, with the peduncles remarkably enlarged. This variety approaches the second in the general character of the flower, but it is altogether darker.

Of the Double Marbled Scotch Roses I make three varieties, which are very different from each other.

The Double Light Marbled has peduncles moderately long, thickened, and smooth; the germen is large and campanulate; the sepals short and triangular; the buds are quite pale; the flower is of a moderate size, more than semi-double, having its petals rather crumpled; their colour in the inside is carmine mottled with reticulations of white veins, this becomes gradually paler from the centre, and the edges, as the flower goes off, becomes nearly white; the backs of the petals are quite pale, shewing very little colour; the styles are swollen. The fruits but rarely come to maturity. This is a very handsome Rose; it flowers soon after the earliest. It is distinct, by its marbling, from the Double Light Red, to which it otherwise approaches.

The Double Crimson Marbled, has small and short peduncles,

free from setæ; the germen is small and semi-globose, and the sepals are small; the bud shews a dark tinge; the flower is very small, and rather more than semi-double; the petals are beautifully marbled with lake and white, and their backs shew the reticulations of their white veins over a rather conspicuous purplish colour. The fruits are few, black, small, and globose. This variety was received from Messrs. Dicksons, brothers, of Edinburgh, by Messrs. Whitley and Co. under the name of *Light Marbled*. It flowers late, and sometimes not very well.

The Double Dark Marbled. The peduncles are moderately long, thin, and smooth; the germen is semi-globose, with small sepals; the bud is of a deep purplish red; the flowers are very numerous, small, and semi-double, opening well, and appearing very brilliant; the interior of the petals is mottled with deep purple lake on a pale ground, the paleness extending more perceptibly to the edges. After the flower has been some time expanded, the edges of the petals become much lighter, but still remain mottled, leaving the centre very distinctly marked with the darker colour, which is always more intense in that part; the yellow claws shew themselves conspicuously when the flower is fully opened. The backs of the petals are not so brilliant as the insides, yet they are of a deep colour, and varied with white lines, but do not appear mottled. The fruits are abundant, rather large, black, and globose. This Rose comes into flower about the middle of the season of Scotch Roses, and is perhaps the most beautiful of the whole tribe; it has been usually sold under the name of the *Double Velvet*, and at Mr. Lee's had been also called the *Petite Red Scotch*.

The character of the DOUBLE TWO-COLOURED SCOTCH ROSES is very peculiar; the petals have distinct colours on their two surfaces; the inside being very dark, and the outside quite pale: as the buds open, the edges of the petals turn back and are exposed to view, thus exhibiting conspicuously the two colours, which are also equally perceptible in the fully expanded flower.

The Small Double Two-coloured has short peduncles, slightly thickened, and covered with setæ; the germen is flatly campanulate, with triangular and short sepals; the bud is at first tinged with dull purple, but soon assumes its two-coloured appearance; the flower is semi-double, and of a good size; the petals are notched, and have their edges revolute; their inside being of a brilliant purple lake, mottled with darker colour, and the outside almost white. The fruits are small, black, and globose, but not abundant.

The Large Double Two-coloured, which has also been called the *King of Scotland*, is in every respect a stronger plant than the preceding. The peduncles are thicker and more hispid; the germen and sepals are larger; the bud is more swollen, and the flower is of greater size, though similar in character, being semi-double; the petals have a pale exterior; but, on their inside, instead of being mottled, are an uniform rich lake. The fruits are few, black, compressed, and open at the top. It is figured by ANDREWS in his *Roses* as *R. spinosissima bicolor*. This is the preferable variety of the two, and is certainly one of the finest of the collection. Both kinds are rather late in flowering.

The DOUBLE DARK-COLOURED SCOTCH ROSES will include all those darker than the red ones heretofore described,

exclusive of those which, on account of having their petals mottled, or of two distinct colours, are placed in the sections of Marbled and Two-coloured.

The small Double Light Purple has slightly hispid peduncles, semi-globose germens, and narrow sepals; the buds are of a very dingy colour, but the flower when open, notwithstanding it is small, is neat and handsome; though fuller than semi-double, its petals are lightly disposed together, and when expanded shew the stamina; the colour of the petals is a reddish purple, much paler on the backs, though not so two-coloured as in those plants so named; the petals are notched, revolute on their edges. The fruits are numerous, black, and compressed. It blossoms late.

The Double Purple is a very late as well as a bad flowering plant; but being distinct, and having been established in our gardens, it cannot be passed over. The peduncles are long, thickened, and smooth, the germen campanulate, and the sepals narrow, the whole tinged with a mahogany colour; the bud is much swollen, and of a palish hue; the flower, though not large, is thick, and full double; the petals grow upright, and are thus cupped, and do not expand freely; their inside is of a dark lake colour, more inclining to purple than any variety I have described; the backs of the petals are much lighter than the inside, but not distinctly two-coloured, though sufficiently so to give a slight appearance of variation to the general effect of the flower. The styles in the centre are, in some cases, swollen into numerous elongated lumps. It does not, generally, produce fruits.

The Double Crimson. I found this in Mr. William Malcolm's nursery at Kensington mixed with another variety. Its peduncles are fine, moderately long, and smooth; the germen is semi-globose, and the sepals long; the bud is of a dark brown red; the flower is small and semi-double, having a few smaller petals in the centre; the inside of the petals is of a deep rich crimson, without marbling; but shewing the reticulation of the veins a little; the backs are not so brilliant, but have the veins perceptible. The flower is very rich and handsome, and except that it is not marbled, has a strong affinity to the Dark Marbled. The fruits are small, few, black, and globose. It is late in coming into blossom.

Having now noticed all the True Double Scotch Roses, which I am well acquainted with, except such as, from their close similarity to those described, do not merit separate mention, I subjoin a table of the Sections and Varieties.

Section I. *Double White Scotch Roses.*

1. Small Double White.
2. Large Semi-double White.
3. Large Double White.
4. Whitley's Double White.

Section II. *Double Yellow Scotch Roses.*

5. Small Double Yellow.
6. Pale Double Yellow.
7. Large Double Yellow.
8. Globe Double Yellow.

SECTION III. *Double Blush Scotch Roses.*

9. Princess Double Blush.
10. Double Lady's Blush.
11. Anderson's Double Lady's Blush.
12. Dutch Double Blush.
13. Double Provins Blush.
14. Double Pink Blush.
15. Double Rose Blush.

SECTION IV. *Double Red Scotch Roses.*

16. True Double Red.
17. Double Light Red.
18. Double Dark Red.

SECTION V. *Double Marbled Scotch Roses.*

19. Double Light Marbled.
20. Double Crimson Marbled.
21. Double Dark Marbled.

SECTION VI. *Double Two-coloured Scotch Roses.*

22. Small Double Two-coloured.
23. Large Double Two-coloured.

SECTION VII. *Double Dark-coloured Scotch Roses.*

24. Small Double Light Purple.
25. Double Purple.
26. Double Crimson.

If, in the course of less than twenty years from the appearance of the first of these varieties, so many have been ob-

tained, a much more extensive list of good flowers may probably ere long be formed. The exertions of Mr. Austin of Glasgow, and of Mr. Lee of Hammersmith, which I have before mentioned, have even already produced some which, when they shall have been examined, and distinguished by appropriate names, will well deserve places in any collection. The greatest improvements which I expect to arise, exclusive of the enlargement of the size of the flowers, will be in the darker colours, and in those of a pure rose colour, which will form a section intermediate between the Blushes and the Reds. In the raising of new plants from seed, with a view to the attainment of new varieties, it is probable that the greater number obtained will resemble those above enumerated, and that by far the greater proportion will bear blush flowers.

The account of the Double Scotch Roses would here terminate if confined to those which are strictly referable to the species; but as there is another Double Rose, which has been long known in the nurseries under the name of *The Tall Double Scotch Rose*, it might seem an omission if I were to leave it unnoticed. The plant appeared in the Hammersmith nursery many years since, having been obtained from the garden of the late Dr. Pitcairn, beyond which I cannot trace its history. This is the Double Scotch Rose to which I have alluded, as being inserted in the second edition of the *Hortus Kewensis*; it is the *R. spinosissima* δ of that work, and is figured by Miss Lawrence, in her work on *Roses*.* The representation there given is tolerably correct, but the

* Lawrence's Roses, pl. 63.

flower is rather too richly coloured. The plant differs much from the Scotch Roses, being of taller growth, and looser habit; the branches do not grow thickly together, but detached; the aculei are of various sizes, and straight, but they are generally small, and many are more like setæ than aculei; the petioles are hairy, the foliola are not flat, but folded together, and bend back at their connection with the petiole; their colour is a paler green than is usual in the foliola of Scotch Roses; they are also more elliptical and more acutely serrated; and their under surfaces are hairy. The peduncles are short, not stiffly upright, thickening towards the top, and having glandiferous setæ; the germen is long, ovate, and smooth, with long narrow sepals, which when the flower opens, are reflected quite to the peduncle. The bud is a bright pink; the flower is large and double, having a fine rich scent; it opens cupped, and has no resemblance to the flowers of the Double Scotch Roses; the centre has a very delicate and beautiful tinge of pale carmine, approaching to flesh colour; the outside petals are so much paler, as to be almost white; the interior petals gradually become shorter and smaller as they approach the centre, and the stamina are seen amongst them; the petals have occasionally a stripe of carmine in them, like to that of a carnation, or similar to the variegation of the York and Lancaster Rose. The flowers become paler after they have been sometime expanded, and as they open in succession, there is a great variety of appearance when the plant is in full bloom. It comes into flower after the true Scotch Roses are over, and is a very desirable plant for any garden.

The tall Scotch Rose above described, is one of the

anomalies in this widely extending genus, for which it is difficult to assign a proper position in an arrangement of the collection. I suspect it to be a garden production, and probably a hybrid; the latter conjecture is strengthened by the circumstance that it does not produce ripe fruits. If its type had existed in a wild state, it would have been placed in the division of the pimpinellifoliæ, with R. involuta, R. Doniana, and R. Sabini, but I cannot think that it has originated from any of these species. There are several other Double Roses of more recent origin, especially amongst the varieties raised by the French, which will assimilate to, and perhaps form a class to which this Rose may be united; but with these I am not, at present, sufficiently acquainted to give a perfect account of them.

XLVI. *On the Management of the Plants belonging to the Genus* Citrus, *in the Garden of* Edward Miller Mundy, *Esq. M. P. F. H. S. at Shipley Hall, in Derbyshire. In a Letter to the Secretary. By Mr.* Richard Ayres, *Corresponding Member of the Horticultural Society, Gardener to Mr.* Mundy.

Read, April 4th, 1820.

Sir,

When you sent me the thanks of the Society, for the specimens of *Citrons*, *Oranges*, *Lemons*, and *Limes*, grown under my direction in the green-house and conservatory at this place, which were exhibited at the Meeting of the Society on the 16th of February, 1819, you requested me to prepare an account of my management of the trees, with a description of the houses in which they grew; in consequence, I now beg leave to submit the following details to the consideration of the Society.

The green-house is forty-nine feet long, and seventeen feet wide, with a glazed sashed roof, sloping to the south; the back and sides are solid walls; the front is nine feet and a half high, and has six glazed folding doors, the intervals between which are filled with fixed glazed sashes. The floor is a stone pavement, and the house is warmed by a flue built on arches, and carried under the pavement near to the front glass, the heated air being admitted into the house through ventilators from a narrow air chamber adjoining to

the flue. The back wall, on the inside, is eighteen feet high, and that, as well as the sides of the house, are covered with a trellis, the openings of which are six inches square. Adjoining the back wall, at even distances from each other, are six holes in the pavement, each two feet square ; in these are growing trees in the following order : 1, a Lemon ; 2, a China Orange ; 3, a Lemon ; 4, a Citron ; 5, a Seville Orange ; 6, a Lemon. They were planted young, nine years since ; the border of earth in which they grow extends under the pavement, and their branches are trained to the trellis. In the same manner, last year, a Citron tree was planted against the west side, and a Lime tree against the east side ; and these are trained to the trellis at the two sides respectively. Besides the above eight trees, there are twenty-two in tubs, seventeen of which were brought from Malta by Captain George Mundy, of the Royal Navy, to his father, six years ago ; they were then small, but have grown finely since, and the fruits they have recently produced have been excellent both for size and flavour. In addition to these trees in tubs, other green-house plants in pots are kept in the house in the winter season. The conservatory, of which a section and ground plan are annexed, is thirty-two feet six inches long ; it is divided longitudinally into three borders ; the back border is three feet eight inches wide, and its level is elevated three feet above the other part of the house by means of a wall which supports it. A paved walk, two feet eight inches wide, is carried over the border, so that only about one foot of it next the back wall is exposed to view : in this border, at even distances, are planted one Lime, and three Lemon trees ; the Lemons are of my own working, they are nine years old from the bud,

and are now in a fine bearing state ; the Lime was only turned out of a tub last March. The centre border is thirteen feet broad ; in it are planted, in a double row, four in each row, at even distances, eight trees, viz.: two standard China Oranges, one Dwarf China Orange, three Seville Oranges, and two Maltese Oranges ; these last are young plants put in two years ago ; the other six trees are all in a bearing state. In the front border, which is only four feet wide, three trees were planted in 1818 ; one is a China Orange, three years old from the bud, and the two others are Lemons.

This house is also used for the growth of Grapes : Vines are planted in the front of it, on the outside, and trained up the rafters of the glass roof, being introduced through holes in the front wall. The trees in each of the three borders of the conservatory are trained in different ways. Those in the back border are fastened to a trellis against the back wall. The trees in the centre border have their branches in part secured to a row of stakes set along the front and sides of the border, at even distances from each other ; the stakes are each six feet in length above the ground, into which they are driven about a foot and a half ; such of the branches as can be brought into contact with these stakes are fastened to them, the others are tied to stakes placed irregularly in different parts of the border, but chiefly at the back ; by these means the branches are spread evenly over the whole extent of the border, are well exposed to the sun and light, and also produce a beautiful effect, whether in blossom or in fruit, the stakes having more the appearance of supports than of being placed for the purpose of fastening the branches to them. The trees in the front border are trained

flat on a horizontal trellis in the manner of Peach trees in a house, the trellis being two feet from the ground.*

The borders both in the green-house and conservatory were filled, at the time the fruit trees were planted, with a compost made as follows: to twelve barrows full of strong turf loam, six of good rotten dung and three of vegetable mould were added; these were properly incorporated six months previous to being used, and then put into the borders. After I had planted both the houses, having a few old trees in tubs and pots which were not in good health, I was induced to try on them the effect of a richer compost, and I also applied to them waterings of a compounded liquid manure. These sickly trees were restored to good health in twelve months and as they made fine fruitful wood, I was so satisfied of the advantage of my new compost and of the composition water, that I determined in future to use them with all my other plants, whether in the borders or in tubs and pots. I have applied them in the manner hereafter detailed, and the beneficial effects resulting from their use have exceeded my expectations, not only in the vigour and richness of the wood and foliage, but in the abundance, size, and flavour of the fruit.

The compost is formed of ten parts (a wheelbarrow full is my usual integral quantity) of strong turf loam, seven of pigeon's dung, seven of garbage either from the dog-kennel

* The iron trellis (as represented in the section) adjoining to the steps which ascend from the lower part of the house to the upper walk is carried along the side of that walk on the edge of the dwarf wall which runs along the back of the centre border; on this trellis is trained a Pomegranate tree, which was planted in March 1818, in the centre of the middle border, near to the dwarf wall; it has nearly covered the trellis already, but has not blossomed.

or butcher's yard, seven of sheep's dung, seven of good rotten horse dung, and ten of old vegetable mould; they must be mixed together twelve months previous to use, that time being necessary to bring the ingredients into a proper state of pulverization.

The composition water is prepared as follows: three wheelbarrows full of cow dung fresh from a pasture field, two wheelbarrows full of fresh sheep's dung, and two pecks of quick lime are thrown into one hogshead of soft water; the mixture is frequently stirred for a week or ten days before it is used, and when applied to the plants ought to be about the consistence of cream.

Previous to describing my method of cultivating the plants I cannot avoid observing that in the usual management of Oranges and other trees of the same description in green-houses, however fine the plants, they only serve the purpose of ornament, and are otherwise useless, never producing any fruit fit for the table. This failure arises from the common practice with most gardeners of taking these trees out of the green-house when they put out the common green-house plants for the summer months; whereas the proper course which they ought to follow, is to keep them in the house through the whole season, and to avail themselves of the removal of the other plants to apply the peculiar treatment necessary to bring them into proper bearing.

From the experience which my practice has given me, I do not think that Orange and other similar trees require much warmth in the winter months; I therefore never suffer my house to be heated above 50 degrees by fire heat until the end of February, or the beginning of March, when, the trees,

if in good health, will begin to shew blossom; the fire-heat should then be encreased to 55 degrees; but the houses ought not to be warmed above 65° at this time by sun-heat, the excess of which must be checked by the admission of air; and indeed the more air the trees have during the time of blossoming, the more certain will be the crop of fruit. My trees are washed with a hand syringe about twice a week in the winter months, advantage being taken of the middle of the day for that work in cold weather; in summer they are washed in the morning, and it is then done every day. During the time the trees are in blossom they require more care in respect to watering, I therefore then use a syringe with a top, the holes of which are so small that they will not admit a fine needle to pass through them. Clean soft water from the cistern in the conservatory is used for all these purposes. As soon as the fruit is set I begin to water the trees at their roots with the composition-water above described, giving more or less according to discretion; the trees having no other sort of water during the summer months, except what little falls from their leaves when they are syringed each morning.

In the early part of June the green-house plants are taken out for the summer, and I then begin to force the trees, by keeping the heat in the house up as near as possible to 75°, for I do not consider that either Citrons, Oranges, Lemons, or Limes can be grown fine and good with less heat. Whilst the forcing is going on particular attention is paid to the waterings above described. In June I also give the trees, whether in the borders or in tubs and pots, a top dressing of the rich compost before mentioned, this is of the greatest advantage

in swelling the fruit, and it is done in the following manner. The earth above the roots is moved with a small hand fork, taking care not to disturb any part of the roots; all the loose earth is then removed clear to the roots, and replaced with the compost. This operation I have performed for the last six years, on the trees in the borders, and to it I principally attribute my success in producing such fine and abundant crops.

With respect to pruning the trees, I do not know that regular directions can be given for the work, but I will state in what manner the trees at Shipley are treated. Early in February they are looked over; at that time it is apparent what wood is likely to be fruitful, and as a certain quantity of old branches are yearly cut away I take out those which seem least promising, and so make room for the younger and more productive wood. If the trees afterwards grow very strong, the shoots are shortened according to their strength, in the same way as Peach trees are shortened. Thus the branches pruned are not only fruitful, but they are restrained to any shape desired, for no sort of fruit trees bear the knife more patiently than those I am treating of.

There is some nicety required in thinning and arranging the crop. When the fruits are about the size of Green Gages it is proper to thin them. Two fruits should never be left together, for they would neither be fine nor well formed; the quantity left to ripen must also depend on the age and strength of the tree. The thinnings have no pulp when of the size above mentioned, and are much esteemed by the confectioner, making excellent preserves.

The fruit which I exhibited to the Society was part of the produce of 1818, which was particularly great in that year, nineteen of the older trees yielded two hundred and seventy eight dozen of ripe fruit, being nearly fifteen dozen on an average to each tree. This quantity was thus produced: the Citron tree in the green-house bore eight dozen, each Citron measuring from fourteen inches and a half to sixteen inches and a half in circumference: three China Orange trees, viz. one in the green-house, and two in the conservatory, had sixty dozen of fruit, some of which measured thirteen inches round; six Seville Orange trees, viz. one in the green-house, three in the conservatory, and two in tubs, bore one hundred and forty dozen of fruit: seven Lemon trees viz. three in the conservatory, three in the green-house, and one in a tub, had fifty dozen of fruit: and from two Lime trees, which were then in tubs, but which are now in the borders, as above mentioned, twenty dozen of fruit were obtained.

The crop was not so large last year, I did not expect it would be so, but the Citron yielded seven dozen of fruit; one of them Mr. Mundy sent to the Society in December last, it was seventeen inches and a half in circumference. The produce of the other different trees was fine, not only as respected its appearance, but the excellence of its quality. The trees th s year promise an abundant crop.

I have the honour to be,
Sir,
Your very obedient Servant,
Richard Ayres.

Shipley, near Derby,
March 13, 1820.

References to the Plate.

A. The back elevated border.
B. The back walk upon arches.
C. Iron trellis on the side of the steps, and continued along the front of the wall, which supports the back walk.
D. The centre border.
E. Bases of columns supporting the glass roof.
G. The centre and side walks.
H. The front border.
I. Cistern for water.
K. Flue nine inches wide and eighteen inches deep, built upon arches (with a cavity of three inches on each side of it), passing from the fire-place at L, under the sides and centre walk into a chimney at M.
N. Flue used in spring, at the time the Vines begin to break, passing in front of the house from the fire place at O, and going out into a chimney at P.

The black spots represent the positions of the trees.

Section & Ground Plan of the Conservatory, at Shipley, Derbyshire.

Thomas Ayres del. Duffield, 1820.

Engraved by J.B. Taylor

XLVII. *Account of a* New Psidium. *In a Letter to the Secretary.* *By* William Cattley, *Esq. F. H. S.*

Read October 3, 1820.

Dear Sir,

I had the pleasure, on the 5th of September, to send you, for the inspection of the Horticultural Society, specimens of the fruit of a plant now growing in my Conservatory at Barnet; it was purchased two years ago from Messrs. Barr and Brookes of Ball's Pond, Newington, who raised it from seed, which they received from China.

It appears to be an undescribed species of *Guava*, allied to Psidium montanum, from which it differs, as it does from the rest of the genus, in having coriaceous obovate leaves, and particularly in the much greater size of the fruit. This is nearly spherical, of a fine deep claret colour, growing in the axillæ of the leaves, and contains from twenty to thirty seeds immersed in a sweet pulp which has a slight acidity.

In 1819 two crops were produced, one of which was ripe in the autumn, and the other at Christmas. The plant is now loaded with fruit, and from the profusion of blossoms already formed, I may venture to predict an abundant crop next Christmas also.

To the cultivators of tropical fruit trees, this plant will certainly prove an interesting acquisition; for, independent of the beautiful effect of the fruit, the plant is highly ornamental

on account of its elegant mode of growth, and the rich dark glossy appearance of its foliage. I have succeeded in obtaining a few plants from cuttings struck under a bell glass, in my stove, one of which I had the pleasure to send some time ago to the garden of the Society; they propagate freely, and with good management may be made to produce fruit in eighteen months. The plant, which I purchased two years ago, was then about twelve inches high; it is now upwards of three yards high; and a plant which I propagated from it soon after I obtained it, is nearly as tall as its parent, and is equally productive of fruit.

Liquid manure, as recommended by our President, but modified by the addition of sheep and stable dung, has been repeatedly applied to the plants within the last three months, and apparently with great advantage.

I am, dear Sir,

very truly yours,

WILLIAM CATTLEY.

Barnet,
September 4th, 1820.

Note by the Secretary.

Mr. HOOKER's engraving of the plant will convey a perfect idea of the appearance of the fruit, which is produced in abundance. The skin has much the consistence of that of a ripe Fig, but is thinner; the interior is a soft fleshy pulp, purplish-red next the skin, but becoming paler towards the middle, and at the centre it is quite white; it is juicy, and in

Drawn & Engraved by Wm. Hooker.

Psidium Cattleianum.

consistence is much like a Strawberry, to which it bears some resemblance in flavour; and though not equal to that fruit, will probably be liked by many persons; it is sweet, and has an agreeable acid. As this Guava has not yet been noticed by any botanical writer, it has not of course received a specific appellation; in compliment to the gentleman to whom the Society is indebted for this communication, and who was the first successful cultivator of the plant, the name of *Psidium Cattleianum* has been affixed to the figure.

XLVIII. *Account of a* New Melon, *with a Description of the Method by which it was obtained. By Mr.* David Anderson, *F. H. S. Gardener to the Lord* Montagu, *at Ditton Park, near Windsor.*

Read September 7th, 1819.

The *Melon* which I had the honour of exhibiting to the Society, under the name of the *Montagu Cantaloup*, was raised by me in the garden at Ditton Park, in the following manner: having cultivated a Green-fleshed Melon, which, though it had much excellence, did not keep long after it became ripe, it occurred to me that this defect might be corrected, if I could obtain seed produced by the impregnation of the female flowers with the pollen of some other kind of Melon, which had firmer flesh; and in the year 1815 I carried my proposed experiment into effect.

In the last week of April, I ridged out two of the Green-fleshed Melon plants under the centre light of a three-light frame, planting some of a good Scarlet-fleshed Melon under the two outside lights, and kept the whole in a state of luxuriant growth, watering them freely till the beginning of June, when they had nearly filled the frame, and shewed fruit abundantly. I then withheld the water, and as the blossoms opened, I impregnated all the female flowers of the Green-fleshed Melons with the male flowers of the other kind. The fruit thus impregnated set well, and under the usual management, I obtained from the centre light six fine Melons, in two of which a very sensible change was perceptible; their

coats became rather cream-coloured than white, and the flesh, instead of being green, was a light pink; the other four were somewhat altered both externally and internally, but not so conspicuously. The seeds of the two first were saved, and in the following year produced the variety which I have now exhibited, partaking in part of the good properties of both its parents; and it has continued true, and a distinct kind, ever since, reproducing itself from seed.

As I continue to cultivate the two old Melons, as well as the new one, I have sent specimens of each for the inspection of the Society.

Note by the Secretary.

The three Melons exhibited by Mr. ANDERSON had all great excellence, and since they differ from each other considerably, they seem as good sorts for cultivation, where variety of fruit is required, as can be selected.

The female parent, to which Mr. ANDERSON gives the name of *Italian Green-fleshed Melon*, is a small fruit,* nearly globose; usually about four inches and a half in diameter; the coat is moderately thin, of a very pale greenish white on the outside; nearly smooth, sometimes quite even, and sometimes slightly lobed; the flesh cuts an inch or more in thickness, it is deep green, particularly near the outside, opaque, soft, and melting; in flavour, both rich and sweet.

* Specimens of this Melon were received on the 17th of August, 1819, from Mr. ISAAC GREGSON, gardener at Harleston Park, in Northamptonshire; and from its great excellence had attracted the attention of the Society, before the exhibition of it by Mr. ANDERSON.

The male parent, which Mr. ANDERSON calls the *Smooth Scarlet-fleshed Melon*, is larger than the female, nearly round, but occasionally inclining to oval; on an average, it is five inches in diameter across the centre of the fruit; the outside of the coat is a greenish yellow, spotted with small green spots, and covered more or less with fine white vermicular reticulations; it is uniform in its shape, not having any appearance of lobes; the coat is thin, and shews deep green when cut; the flesh is near an inch and a half in thickness, of an uniform bright scarlet from the edge of the coat to the centre, and tolerably firm; it is peculiarly high flavoured.

The *Montagu Cantaloup* is intermediate in size between its parents; sometimes it is round, sometimes oval; being rather less than five inches in diameter on an average: the outside of the coat is greenish white without spots, but covered with vermicular reticulations, slightly broader than those of the male parent; these are frequently very thickly spread over the coat, and occasionally less so; it is entirely without lobes; the coat is moderately thin, shewing pale green when cut; the flesh averages an inch and a quarter in thickness, is red, but not high coloured, the bright colour of the male being lowered by that of the female; it is particularly soft and juicy, completely melting in the mouth, and with a very sweet and delicate flavour.

XLIX. *On the Cultivation of the* Cocks-comb. *In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read December 19, 1820.

Dear Sir,

The flower of the *Cocks-comb*, which I sent to the Meeting of the Society on the 17th October, may be considered a fair sample of all that I grew this year; two of six having been larger, and two somewhat smaller.*

In cultivating these plants, I have treated them precisely as I do my Pine-apple plants, having in some respects a similar object in view; for in both a single fruit stalk of great strength is requisite, the protrusion of which should be retarded as long as possible, consistently with the rapid growth of the plant. The compost I employed was the most nutritive and stimulating that I could apply, consisting of one part of unfermented horse dung fresh from the stable, and without litter, one part of burnt turf, one part of decayed leaves, and two parts of green turf, the latter being in lumps of about an inch in diameter, to keep the mass so hollow that the water might have free liberty to escape, and the air to enter. Manure was also given in a liquid state by steeping pigeon dung in the water, which was given very

* The flower sent by Mr. Knight measured eighteen inches in width and seven inches in height, from the top of the stalk; it was thick and full, and of a most intense colour. A very accurate drawing of it has been executed by Mrs. Pope, and placed in the Library of the Society.

freely. The plants were put, whilst very small, into pots of four inches diameter, and three inches deep; as soon as their roots had reached the sides of the pots, and before they had become, in any degree, matted, they were transplanted into pots of a foot in diameter, and about nine inches deep. Particular attention was paid to the state of the roots, for I have reason to think that the compression of them in the pot has, under all circumstances, a tendency to accelerate the flowering of plants.

Under this mode of treatment, the plants became large and strong before they shewed a disposition to blossom; they usually divide into many branches (as the Pine-apple plant will also do), which will greatly injure them, if due attention be not paid to remove the side branches, when very young. My plants were at all times so placed that their leaves reached within a few inches of the glass, and they were subjected to the same heat (from 70° to 100°,) during the summer, as my Pine-apple plants.

The seeds of the plants, which I raised in the present season, were not sown till too late in the spring; and if I were to repeat the experiment, I entertain no doubt of producing much larger flowers than the one I sent you; for, the variety, I believe, is of superior excellence. It affords seeds very sparingly, as you would perceive by the specimen sent.

I am, dear Sir,

very sincerely yours,

THOMAS ANDREW KNIGHT.

Downton,
November 4th, 1820.

L. *On the Classification of* Plums. *By Mr.* John Robertson, *F. H. S.*

Read September 5th, 1820.

Having, in a former communication,* had the honour to present to the Horticultural Society an attempt to effect a systematic arrangement of the varieties of the Peach and Nectarine, I now beg leave to lay before it, a further endeavour to reduce those of the *Plum* under a similar *classification*. For this purpose, I have, as in the former instance, disposed them in classes, divisions, and subdivisions.

Adhering also to the same principle, that the greater divisions, forming the basis of the structure, should be distinguished by the most obvious, precise, and permanent characters, in framing this arrangement, I have founded the classes on the appearance, or non-appearance of down on the extremities of the year-old shoots of the plant, dividing, by this means, the family of Plums into nearly equal portions; each of these I have separated into two divisions, distinguished by the shape of the fruit, under the denomination of Round and Oval; expressions to be understood with some latitude, the former designating all such Plums as are globular, though depressed or flattened, and the latter all those which vary from the globular form to any length.

* See vol. iii. page 380.

These divisions I have subdivided, resorting to the colours of the fruit for the characters of the subdivisions, and forming them under the heads of dark-coloured and light-coloured; the former term comprehending the reds, violets, and blacks; the latter the whites, yellows, and greens, with all their intermediate shades. The subdivisions might have been multiplied, by creating one for each colour; but such an increase of the number would rather tend to perplex the system than render it more perspicuous, or practically useful; the colours of fruit occasionally varying so much, and blending with each other so indistinctly, as to render it difficult, by any precise terms, to express the versatile appearances they often present under different circumstances.

I have illustrated each subdivision by a reference to a well known variety. It was my wish to have given a table of all the kinds with which I am acquainted by cultivation in my own collection; but I have been deterred from attempting this, on account of the liability to error which I labour under from the uncertainty of names, not having any standard of reference, by which to verify my nomenclature. This want will, I hope, at some future time, be supplied by the horticulturists in the vicinity of the capital, who, with the advantages of various and rich collections, superior climate, and mutual intercourse, under the guidance of the Horticultural Society, may be expected to form a Catalogue Raisonné of all the known varieties of fruits in the United Kingdom, to become the settled guide in correcting the names of the productions of our gardens.

Should it be desirable further to divide the subdivisions, it might be done by adopting the separation of each

into two sections, containing the Plums whose flesh adheres to the stone, and those whose flesh parts from the stone.

SYNOPTICAL TABLE OF PLUMS.

- **PLUMS**
  - with shoots downy at their extremities.
    - with round fruit
      - Dark-coloured — Blue Gage.
      - Light-coloured— Green Gage.
    - with oval fruit
      - Dark-coloured —Precoce de Tours.
      - Light-coloured— Jaune Hâtive.
  - with shoots naked at their extremities.
    - with round fruit
      - Dark-coloured —Damas de Maugeron.
      - Light-coloured— Drap d'or.
    - with oval fruit
      - Dark-coloured —Red Magnum Bonum.
      - Light-coloured—White Magnum Bonum.

LI. *Account and Description of the Varieties of* Chinese Chrysanthemums *which at present are cultivated in England; with Observations on the Difference between the* Chrysanthemum Indicum *of* Linnæus *and those Plants.* *By* Joseph Sabine, *Esq. F.R.S.* &c. Secretary.

Read February 20th, 1821.

The *Chrysanthemums*, of which I now propose to give descriptions, are natives of China or Japan, and with the single exception of the Purple, are very recent introductions. They contribute so much to the beauty of our gardens in a fine autumn, and of our conservatories in the months of November and December, when scarcely any other plants are in blossom, that they are peculiarly deserving the attention of the ornamental gardener. In the autumn of last year twelve varieties (all that were then known in this country), whose flowers and habits have been well ascertained, were cultivated in the garden of the Horticultural Society.

Much diversity of opinion has existed amongst botanical writers as to the true generic name of the species to which these plants belong. The foreign botanists of later times have considered it as an Anthemis, and with them it has been successively named *Anthemis grandiflora,† Anthe-

* Ramatuelle in Journal d'Histoire Naturelle, vol. ii. page 233. Desfontaines Histoire des Arbres, &c. vol. i. page 315.

† Willdenow Species Plantarum, vol. iii. page 2184. Willdenow Enumeratio Plantarum, vol. ii. page 911.

mis Artemisiæfolia,* Anthemis stipulacea. Modern English writers on plants have nearly all concurred in calling it Chrysanthemum Indicum, and under that name it will be found in the second edition of the *Hortus Kewensis*,† in the *Botanical Magazine*, and in the *Botanical Register*. In Sweet's *Hortus Suburbanus Londinensis* it appears with Willdenow's name of Anthemis Artemisiæfolia.

This difference respecting the name arises from the circumstance of small paleæ or chaff, being found on the receptacle of the flowers of the Chinese Chrysanthemums at the base of the florets; these are characteristic of the Genus Anthemis, the receptacle of Chrysanthemum being always without paleæ; but the accession of these appendages to the florets, in our plants, are considered by the advocates of the latter appellation as the effect of cultivation and of the change in the form of the flowers; for they are of opinion that if the original type in its single state could be ascertained and examined, it would be found destitute of paleæ.

The name of Chrysanthemum Indicum originated with Linnæus‡ in 1753; he divided the species into two varieties, one apparently with single, the other with double flowers. In 1789 a living plant of the Purple Chinese Chrysanthemum was brought from China into France, being the first of the species introduced, in modern times, into Europe; when it blossomed, an account and description of it were published by M. Ramatuelle,§ who at first sup-

* Moench Supplementum ad Methodum Plantarum, page 258.

† Hortus Kewensis, Edit. 2, vol. v. page 95.

‡ Species Plantarum, Edit. 1, vol. ii. page 889.

§ Journal d'Histoire Naturelle, vol. ii. page 233.

posed it to be a double Chrysanthemum Indicum, but in his memoir he called it Anthemis grandiflora, having satisfied himself and the French botanists that it could not be the Chrysanthemum Indicum of Linnæus. When Curtis, in 1796, figured* and described the same plant in England, he, without referring to the account of M. Ramatuelle (with which he probably was not then acquainted, owing to the state of hostility in which the two countries were placed), called it Chrysanthemum Indicum, and this name has been since generally applied to it in England. Were I to detail the particulars of the investigation which I have gone into, in order to ascertain how far the Chinese Chrysanthemums are properly referable to the Chrysanthemum Indicum of Linnæus, the present Paper would be extended to an inconvenient length, and the discussion might also be considered somewhat foreign to the purposes of the Society. I will therefore only briefly state the result.

The descriptions of the authors quoted by Linnæus, and the figures referred to, for both his varieties of Chrysanthemum Indicum, all shew, that the plants he had in his mind produced very small flowers, having a great resemblance to the common Chamomile with single or double flowers; but that the leaves were very similar to those of the Chinese Chrysanthemums. It further appears that Linnæus omitted to refer to several descriptions and notices of plants by writers of authority (some of whose works he has even quoted in his account of the Chrysanthemum Indicum), which are evidently applicable to the Chinese Chrysanthemums, and

* See Botanical Magazine, plate 327.

therefore it is inferred that he did not consider the Chrysanthemum Indicum and the Chinese Chrysanthemums as identified. But the most remarkable confirmation of this opinion is, that the Chinese Chrysanthemums are most accurately described as cultivated in the gardens of Holland in 1688, by BREYNIUS,* a writer of considerable merit and note, whose work could not be unknown to or unobserved by LINNÆUS. BREYNIUS calls them "Matricaria Japonica maxima, flore roseo sive suave-rubente pleno elegantissimo, *Nobis*;† Kychonophane, *Japonensibus*," and no less than six varieties, "floribus suave-rubentibus, candidissimis, purpureis, luteo-obsoletis, carneis atque phœniceis," are mentioned. These plants were subsequently lost in the Dutch gardens, for no further account of them, except that given by BREYNIUS, can be traced, nor were the gardeners of Holland acquainted with them when again introduced into Europe.

Those who still continue the application of the name of Chrysanthemum Indicum to the Chinese Chrysanthemums, admit them, I believe, to be distinct varieties from those described by LINNÆUS, whilst the persons who advocate the opposite opinion consider Chrysanthemum Indicum as only applicable to the plants with small flowers, and the others as belonging to the genus Anthemis.

There is no doubt but that the plants which are held to be the real Chrysanthemum Indicum exist in China, though, from the want of beauty in comparison with the more brilliant Chinese Chrysanthemums, they have not been selected as worthy of being transmitted to Europe: but as they will

* Breynius Prodromus Plantarum rariorum secundus, &c. page 66.

† Kiko no Fanna, is one of the names by which THUNBERG in his Flora Japonica states that these plants are known in Japan.

be certainly considered as valuable acquisitions, I have obtained representations of both the single and double varieties, which are here given, in order to point out more exactly the objects to be obtained. The first of these, the single plant, is taken from a Chinese specimen in the Herbarium of the late Sir JOSEPH BANKS, now in the possession of my friend Mr. ROBERT BROWN, and with his permission drawn by Mr. HOOKER. The figures of the double variety are copied from one of the drawings of Chinese plants in the collection belonging to the East India Company, in their library in Leadenhall Street. It will be observed that the flowers on one of the branches of this last figure are quite double, whilst those on the other branch shew a small disc; they were probably taken from two distinct plants. These two figures will clearly illustrate what is considered as LINNÆUS's Chrysanthemum Indicum in a single and double state.

The first introduction of the Chinese Chrysanthemums into this country is stated in the *Hortus Kewensis*,* to have occurred previous to 1764, in which year a specimen of one from the Apothecaries' Garden at Chelsea was presented†

* Second edition, volume v. page 95.

† *Philosophical Transactions*, for 1765, vol. lv. page 91. By the deed of conveyance of the land forming the Botanical Garden at Chelsea from Sir HANS SLOANE to the Apothecaries' Company in 1722, they were bound to present to the Royal Society fifty dried specimens of distinct plants from the garden annually, until two thousand had been delivered. In August in the same year, Mr. PHILIP MILLER, who was then recently appointed the gardener, prepared the first fifty of these specimens, and the practice was continued until a larger number than the condition demanded had been presented. The last regular presentation was in February 1774, four years after MILLER's death, and with this the number amounted to 2550 specimens, or 51 different presentations, since the year 1722. Subsequently they were not so regularly presented, and the last contribution of these specimens was in 1794.

Chrysanthemum Indicum. Linn.

Chrysanthemum Indicum. flore pleno.

to the Royal Society, under the name of *Matricaria Indica.* This specimen is preserved in the British Museum (MILLER's Specimens, No. 2112. Anno. 1764); it is small, and not very perfect, but no doubt would be entertained that it is referable to one of the varieties of the Chinese Chrysanthemum (perhaps the Rose or the Buff), did not MILLER's account* of the plant, in his *Gardener's Dictionary*, entirely disagree with almost every particular of the Chinese Chrysanthemum. He states that it is produced naturally in many parts of India, that he received it from Nimpu (probably Ning-pu in China), where it grows plentifully; that it rises to a foot and a half in height, dividing into many branches furnished with angular oval leaves acutely serrated on the edges, and of a pale colour; that the flowers are produced on foot-stalks, which rise from the wings of the leaves, or which terminate the branches; that they are very double, and of the size of the double Feverfew. He does not mention the colour of the flower, but adds that it blossoms in July, and in favourable seasons ripens seeds late in the autumn; that it is propagated by seeds, which should be sown in spring on a hot-bed and treated in the manner of a tender annual. If such was the plant from whence the specimen was gathered, it is neither the Chrysanthemum Indicum of LINNÆUS nor one of our Chinese Chrysanthemums. But if MILLER's Dictionary be in error, and the specimen correct, we have on record another instance of the introduction of one of these plants into Europe, and of its

* See Article *Matricaria Indica*, in MILLER's Dictionary, Eighth edition, 1768.

subsequent loss; for it is certain that no such plant was in existence either at Chelsea or any where in England when the varieties we now have, first appeared amongst us.

Previous to the introduction of the Chinese Chrysanthemums into our gardens in modern times, we possessed tolerably correct accounts of their variety and beauty from those writers who had described the native plants of China and Japan. KÆMPFER,* in his *Amœnitates exoticæ* (pages 875, 876, and 877), published in 1712, describes, under the name of *Matricaria*, eight varieties with double flowers, forming a principal ornament of the gardens of the Japanese, who call them, as he mentions, *Kik*, *Kikf*, or *Kikku*. THUNBERG, in his *Flora Japonica* (page 320), published in 1784, considering them as belonging to Chrysanthemum Indicum, refers to KÆMPFER's account, gives the names of *Kikokf* and *Kiko no Fanna* (this last addition being expressive of elegance), as well as those of KÆMPFER, and says that there are many varieties different in the colour and size of the flower, and that there are single as well as double flowering plants, which are much cultivated in the houses and gardens of Japan, on account of their beauty. LOUREIRO, in his *Flora Cochinchinensis* (page 499), published in 1790, also describes them, noticing the variety of the colour of their flowers, which, he states, are White, Blush, Purple, Violet, Yellow, and Red, differing in form and size, and mentions that they are cultivated in the gardens of China and Cochin-china.

To the zealous gardeners of England, and more especially

* He is one of the authors not quoted by LINNÆUS in his Species Plantarum, under Chrysanthemum Indicum.

to Sir ABRAHAM HUME, we are indebted for the many kinds of Chinese Chrysanthemums which we now possess; but the credit of their first re-appearance, as far as their present existence is concerned, belongs to M. BLANCARD,* a merchant of Marseilles, who in 1789 imported three different plants from China, one with Purple, one with White, and one with Violet flowers. He lost the two last; the first lived, and was sent to the Jardin du Roi at Paris in 1791. This is the *Purple* variety; it had been transmitted to this country from France in 1790, and after its arrival here, the *Changeable White* was obtained from it by cultivation. Between the years 1798 and 1808, inclusive, eight new varieties were imported from China into England, in the following order: the *Rose* and the *Buff* together, in 1798; the *Golden Yellow*, and the *Quilled Yellow* together, in 1802; the *Sulphur Yellow* at the latter end of the same year; the *Spanish Brown* in 1806; and the *Quilled White* and *Large Lilac* together, in 1808. Of these the Sulphur Yellow was imported for the late THOMAS EVANS, Esq. of Stepney, and the other seven sorts for Sir ABRAHAM HUME. Later importations have produced two others, the *Tasselled White* in 1816, and the *Superb White*, in 1817. In May, 1819, Messrs. BARR and BROOKES of Ball's Pond, imported, in the Lady Melville Indiaman, commanded by Captain JOHN STEWART, three more Chrysanthemums (together with various other curious plants, under the charge of Mr. JOSEPH POOLE, a gardener sent out by them, for the express purpose of collecting Chinese plants), but these have not blossomed in

* Journal d'Histoire Naturelle, vol. ii. page 233.

sufficient perfection to afford opportunity for making correct descriptions of them.

The eagerness of collectors of curious plants for these Chrysanthemums has increased with their number, and the attention of this Society has been in consequence directed to the introduction of others, and, I am happy to state, with considerable success. In August 1819, three living plants reached our garden from China, through the obliging attention of Captain Henry Andrews Drummond, of the Castle Huntley; one of these, which flowered early last autumn, has received the name of the *Quilled Flamed Yellow*, being quite new, and if not equal in beauty, is superior in grandeur to any of the older ones; the second, on the appearance of its blossoms, was ascertained to be the Superb White, which we before possessed; the third is a late flowering one, and though from the deficiency of light and suitable temperature in the last season, it did not blossom perfectly, it has shewn sufficient of its flowers to enable me to decide that it is new, and to distinguish it as the *Quilled Pink*.

In June of the last year, from the skilful management of Captain Charles Otway Mayne, of the Atlas, a box containing twelve varieties, which was entrusted to his charge by our active correspondent at Canton, John Reeves, Esq. arrived safe, with the loss of only a single plant, so that we confidently anticipate a large stock of novelties in the ensuing autumn.

I now proceed to a description of the different varieties which I have noticed as at present known in our gardens.

1. *The Purple Chrysanthemum*, has been called, the Old

Red, the Old Purple, and the Quilled Purple. The plant grows usually about four feet high; the branches produce the flowers in a loose corymb or cluster. The flowers in this variety expand about a fortnight after the earliest sorts; they have a strong scent, resembling Chamomile; their colour is rather a dull purple; the florets not growing very compactly together, and projecting, form a sort of expanded tassel-like flower, which generally has a dependent or nodding appearance; the expansion of a large well formed flower is from two and a half to three inches; the middle of the flower is generally filled with the long radiate florets, but sometimes a few short yellow florets are seen, and form a disc in the centre; it is then considered as semidouble; the radiate florets are tubular, but usually expand with a flat lip, splitting on their inside to more than half their length; their backs are a purplish gray, which is seen as the flower is viewed in front when the quills are not opened, giving a two-coloured appearance to the whole flower; the external florets are larger than those which are nearer the centre. The leaves are small and short in comparison with those of some other kinds, the indentations forming the lobes are deep, their serratures are sharp-pointed, and the backs of the leaves are more hoary than is usual. This was introduced from France into the royal gardens at Kew, from M. CELS of Paris in 1790; it flowered first at Mr. COLVILL's, in the King's Road, in November 1795, and it was figured in the *Botanical Magazine*,* plate 327, soon after; it is the variety ε, or Purple

* In the observations on this plant in the *Botanical Magazine*, the accounts given by RHEEDE, in the *Hortus Malabaricus* (vol. x, page 87, tab. 44) of the Tsjetti-pu of that work, and by RUMPHIUS, in his *Herbarium Am-*

Quilled of the second edition of the *Hortus Kewensis*, and the variety η, or Quilled Purple, of SWEET's *Hortus Suburbanus*. Occasionally a branch of this will produce white flowers, and from such accidental sport the next kind was, I believe, originally obtained; the sporting branch being taken off and propagated, the variation became fixed. M. RAMATUELLE, in his description* of the flowers produced on the plant in Provence, mentions that the ligulate florets were sprinkled with small yellow dust, which was sweet-scented; the flowers at Paris were without this addition, nor has it, as far as I can learn, ever been observed in this country; it was probably caused by the greater heat of the climate of the South of France.

2. *The Changeable White Chrysanthemum*, has also been called the Old White, the Early White, and LEE's White. This being a sported variety from the purple, it consequently agrees in all points with that plant, except in the colour of the flowers. The variation of its flowers are great; sometimes the florets are pure white, especially in a cold situation; sometimes the backs of the inner florets, and the whole of the outer florets, are a pale purple; sometimes each floret will be striped purple and white, and thence it has got the name of the Magpie Chrysanthemum; when in a warm aspect, and in a fine autumn, the centre florets will be purple

boinense (vol. v, page 259, tab. 91, fig. 1,) of his Matricaria Sinensis, are detailed at some length, as if applicable to the Chinese Chrysanthemum. The plants described and figured in both these works are certainly referable, as far as can be ascertained, to varieties of the small flowering Chrysanthemum Indicum.

* See Journal d'Histoire Naturelle, vol. ii. page 237.

and the outside florets white, in which state it has been figured in the *Botanical Magazine*, plate 2042. At other times, though but rarely, one side of the whole flower will be purple and the remainder white; and occasionally the outer florets will be purple and the inner white. This plant is not noticed in the second edition of the *Hortus Kewensis*; it is the variety δ, Alba or White, of SWEET's *Hortus Suburbanus*. My enquiries respecting the original production of this plant have not ascertained any thing certain, further than that the variation from the purple kind was secured by propagation of the sported branch in this country. Mr. JAMES MEAN, Sir ABRAHAM HUME's gardener, to whom I am indebted for much information relative to the introduction of these plants, thinks that it originated about 1802, in the garden of the Bishop of LONDON, at Fulham. Messrs. LEE and KENNEDY had it first for sale in the Hammersmith Nursery, soon after that time.

3. *The Quilled White Chrysanthemum.* The plant grows nearly to the same height as the purple, as the branches are numerous there are plenty of flowers on the whole plant, and there are many flowers on each corymb. This comes into blow the first of all the varieties; in the scent of its flowers it differs singularly from all the other kinds, having a strong resemblance to that of new honey-comb before it is filled with honey. The flowers, on first opening, have a pale yellow cast, which continues longest in the centre, they then become pure white, sometimes having a tinge of purple on the outside florets, and this is always increased by cold weather; the florets project, and grow compactly together; the whole flower is nodding, and looks like a close tassel; the expansion

of the flower is small from the projecting growth of the florets; the centre of the flower is quite filled, and shews no disc, the florets are perfectly tubular, rather long, though of unequal length, without any lip, having only a small opening at the top. The leaves are middle sized; the indentures of their lobes are shallow, and the smaller divisions of the leaves are nearly rounded, and almost without points. This and the Large Lilac were introduced from China in September 1808, by Captain GEORGE WELSTEAD, of the Alfred Indiaman, for Sir ABRAHAM HUME. It is the variety δ, or White Quilled, of the second edition of the *Hortus Kewensis*, and the variety ε, or Quilled White, of SWEET's *Hortus Suburbanus*. It is figured in the *Botanical Register*, plate 4, with the Golden Yellow variety, but the smaller divisions of the leaves are there represented as pointed, which is not correct.

4. *The Superb White Chrysanthemum.* This plant grows tall, with few main branches, but each of these bears smaller branches, and have several flowers in the corymb at their extremities. Its flowers, which are produced rather late in the season, have a strong scent of Chamomile; the flowers are a very pure white, but sometimes, especially when the flower is going off, are slightly tinged at the back of the outer florets with pink, the centre of the flowers has at first a yellow hue in consequence of the lower part of the florets being of that colour, the expansion of a good flower is full four inches; the outer florets open flat, and extend regularly outwards; the inner florets are inflected over each other, having some resemblance, except in colour, to the parts of the Warratah flower; the centre of the flower is at first quite

filled with the inner florets, which turning inwards, lie closely imbricated over each other; they afterwards open, and shew a yellow disc. The florets are tubular, with large wide lips, the tubular part enlarges upwards towards the lip, and the expanded lip is hollow, or spoon-shaped. The leaves are large, long, and very deeply cut, almost to the bottom; the lobes are slightly lapped over each other; the serratures are narrow and have sharp pointed terminations. The foliage remains perfect longer than that of the others, and the stem is particularly strong and hard. This is a new introduction; it flowered first in the garden of Messrs. BARR and BROOKES, at Ball's Pond, in 1818, having been imported by Captain JOHN CHRISTOPHER LOCKNER, in the Alfred Indiaman, and given to them by him in May 1817. It is on the whole a very magnificent variety, and the flower being singular in its formation, and very delicate in its appearance, it has additional claim to preference. It is noticed in the account given of the Changeable White, in the *Botanical Magazine*, plate 2042, and has been figured in the *Botanical Register*, plate 455, accompanied with a notice respecting it, which was drawn up by me at the request of Mr. BELLENDEN KER, the editor of the latter work.

5. *The Tasselled White Chrysanthemum.* This plant, though of earlier introduction than the preceding, has not been so generally known or so extensively propagated, in consequence of having been at first only in the possession of a private individual. It is of strong and vigorous growth, and is very late in producing its flowers, which have the scent of Chamomile, though not very powerfully. The flowers are numerous in the corymb formed at the end of each branch;

their white is of peculiar delicacy, but a little tinge of pink is sometimes, though rarely, observable in some of the external florets. The general form of the flower at first is widely bell-shaped, the external florets projecting and expanding, their ends being recurved; the centre florets are curled inwards, and no disc is perceptible; sometimes the middle of the flowers appear tinged with greenish yellow, which is caused by that colour being at the base of the florets; from the unequal length of the florets, the flower is rather irregular in its expansion; the flowers are pendulous when fully blown, and the florets being long and weak in texture, hang loose, and give the whole an appearance of a tassel composed of white shreds; this is its best and handsomest state, and unless the blossom has been good it does not become thus pendulous, but remains expanded flat, and when in that state has been supposed to be a distinct variety, and been called the Expanded White. The external florets are long and tubular, the internal ones are shorter, and have tubes only a very short part of the length; the lip is well expanded, and having its edges as well as its end recurved, is exactly the reverse in appearance of that of the florets of the Superb White. The leaves are rather large, and of a very deep green; the indentations of the lobes are very shallow, and the smaller divisions are blunt, with obscurely pointed terminations. This plant was imported by Captain Richard Rawes, in the Warren Hastings, in May 1816, and by him given to his relation, Thomas Palmer, Esq. of Bromley; it first flowered in 1818, when I saw it in perfection in Mr. Lee's garden at Hammersmith; Mr. Lee obtained the stock of it from Mr. Palmer.

6. *The Quilled Yellow Chrysanthemum*, called also the Quilled Straw-coloured. The plant grows higher than any of the other sorts, and bears a moderate quantity of blossoms, which are produced almost as late in the season as those of the preceding; they have a very strong scent of Chamomile; the colour is pale yellow; the florets do not grow compactly together, but expand much, and so appear detached and separate, and lie nearly flat when the flower is full blown, but they project at first; the expansion of each flower, when in good state, is about three inches; no disc is apparent, for the centre is filled up with small and short ligulate florets; the florets have very large tubes, with small expanded lips. The leaves are broad, slightly indented; their smaller divisions are rounded, and rather blunt. This and the Golden Yellow were introduced in June, 1802, by Captain JAMES PENDERGAST, in the Hope Indiaman, for Sir ABRAHAM HUME. Captain PENDERGAST, though he subsequently commanded the Hope, at that time acted only as Mate on board that ship. This is a favourite sort, the flower being peculiarly neat. It is the variety γ, or Straw-coloured Quilled, of the second edition of the *Hortus Kewensis*, and is the same in SWEET's *Hortus Suburbanus*.

7. *The Sulphur Yellow Chrysanthemum*, called also the Straw-coloured, the Brimstone, and the Early Yellow. The plant grows tall, upwards of four feet high in most cases, with few branches, which spread horizontally, especially when planted in a border; it never has a great number of blossoms. It comes into flower before all the other kinds, except the Quilled White; its flowers have the scent of Chamomile strongly. The colour is entirely pale yellow; the

florets lying flat, close on each other, and rather projecting, are formed into an expanded somewhat bell-shaped flower, hollow in the centre, and shewing a yellow disc from whence several small ligulate florets usually arise; the flowers, when going off, from the length of the florets and their loose mode of growth, become confused and ragged in appearance; the expansion of the flower as it grows is about two inches and a half; the florets are not quilled but are entirely ligulate, broad, and rather curled at the end; they are of various lengths, so that they do not appear regularly arranged; sometimes the outer florets, at going off, are tinged on the back with red, and this also happens when the plant is touched by cold. The leaves are deeply indented, having the lobes very distinct from each other, and the serratures are sharp pointed. It was introduced in September, 1802, by the late Thomas Evans, Esq. of Stepney, having been brought over for him by Captain Henry Wilson, in the Warley. It is the variety β, or Straw-coloured, of the second edition of the *Hortus Kewensis*, and the same of Sweet's *Hortus Suburbanus*, under the name of Flava, or Straw-coloured.

8. *The Golden Yellow Chrysanthemum*, called also the Large Yellow, and the King's Yellow. In habit and style of flowering it strongly resembles the Sulphur Yellow. The flowers expand nearly at the same time as those of the purple, and have a strong chamomile scent; the colour in front is a deep yellow, the back of all the florets being tinged with reddish orange, which is not, however, seen except in young flowers; in the bud it is most perceptible. The florets are numerous, and lie close on each other; at

first they project a little, but afterwards expand flat in the manner of a double Sun-flower; when the flower is fully blown, a pale yellow disc is apparent; but before this the small florets in the centre are remarkably folded over the disc; sometimes the flower is so fully double, as to exclude the appearance of the disc. The flowers grow upright, and do not nod; the expansion of the largest is full three inches and a half. The florets are entirely ligulate, not being at all tubular; they are of various lengths, even in the same series, and have all a sharp point at their extremity. The leaves are deeply indented, the sides of the lobes nearly touch, and the serratures are sharp and pointed. The stems at the time of flowering are rather bare of leaves. This was introduced in June, 1802, for Sir ABRAHAM HUME, with the Quilled Yellow, as mentioned in the account of that plant. It is the variety α, of both the second edition of the *Hortus Kewensis* and of SWEET's *Hortus Suburbanus*, under the name of Aurea with the latter and of Golden Yellow with both, and it is represented in the upper figure of the 4th plate of the *Botanical Register*; the backs of the florets, which are characteristic of the variety, are not however exhibited in that figure.

9. *The Large Lilac Chrysanthemum*, called the Late Lilac, the New Lilac, and Semidouble Purple. It grows high and strong, taller than all the others, except the three Yellows, bearing but few flowers in comparison, for there is frequently only one and seldom more than three on each shoot; their scent is that of strong Chamomile; they have a variegated appearance arising from the two colours of each of the florets, but they may be described in general as a light purple or

lilac, more brilliant and shewy, though paler than the old purple; the florets are numerous, and expand flatly, always exhibiting, when fully blown, a disc of short yellow florets, so as fairly to be called a semidouble flower. The interior florets are paler, and so give the inside part of the flower an appearance of whiteness; they have more resemblance to China Asters than any of the other kinds. The flowers stand well upright, and their expansion is upwards of three inches, looking grand and handsome, though rather ragged or irregular when in full blow. The florets, before they expand, are curled over the centre, quite hiding the disc; the interior are shorter than the exterior florets; they are tubular, opening variously, but generally the tube is longer than the lip, except in the interior florets, which are more expanded; the inside of the tube and of the lip is almost white, the outside of the tube is coloured, some little purple stain is also at times in the inside of the lip; the florets, though numerous, in consequence of the length of their tubes, appear to stand distinct from each other. The leaves are very large and strong, very deeply indented, with the sides of the lobes contiguous, having their smaller divisions round, with sharp points. This, with the Quilled White, as before mentioned, was introduced in September, 1808, by Captain Welstead for Sir Abraham Hume. It is not noticed in the second edition of the *Hortus Kewensis*, but is the variety ζ Purpurea, or Semidouble Purple, of Sweet's *Hortus Suburbanus*.

10. *The Rose or Pink Chrysanthemum*, called also the Lilac. It grows shorter than the Purple, usually under four feet in height, with numerous stems, and abundance of flowers standing on shortish foot-stalks. The flowers come

out rather before those of the Purple ; their scent is pleasant, though slightly touched with that of Chamomile ; their colour is purplish flesh, or rose. The florets being nearly of equal lengths, and the inner ones projecting, they form a globular though not very compact flower, without the least appearance of disc ; the flowers stand upright ; their expansion, measuring at the back, being less than two inches ; the younger and inferior flowers are flatter than the principal ones ; there is often a variation in the appearance of the centre of the flower, from the inner florets being much paler than the outer ; the florets are short, broadly ligulate, and without tubes, rather paler behind, though not much so, having their margins a little distinguished by white. The leaves are large and broad, deeply indented, the sides of the lobes being remote, and the serratures sharp pointed. This and the following were introduced for Sir ABRAHAM HUME in October, 1798, in the Hope Indiaman, by Captain PENDERGAST, the same gentleman whose exertions I have before recorded ; they were the first increase to our stock after the Purple. Both these sorts appear to grow better in the open air than the others, for they are much more abundant in all the small gardens in the vicinity of London. The plants of this variety occasionally sport and produce a few flowers of the next sort, from which circumstance it has been supposed that they are the same plant, and (since some plants of the other sport into this) convertible into each other ; but I am assured by Mr. JAMES MEAN, Sir ABRAHAM HUME's gardener, that the original plants of both kinds which came from China do not sport, but still continue distinct. It is the variety ζ, or Lilac-coloured, of the second edition of the

Hortus Kewensis, and the variety θ, Lilacina, or Lilac-coloured, of SWEET's *Hortus Suburbanus*.

11. *The Buff or Orange Chrysanthemum*, called also the Copper-coloured. This nearly agrees with the Rose in all points, except the colour of its flowers; but it is in general rather shorter in growth and the scent of the blossoms is different from the others, and is thought to resemble slightly that of a Wall-flower. The florets are yellow, tinged both behind and before with purple, so as to form a dingy orange or reddish buff; the edges of the florets are yellow, and the centre florets having more of the yellow, causes the inside of the flower to look paler: the late flowers have still more yellow, some are almost entirely of that colour. This is a very handsome variety. The original plant, with that of the Rose, was introduced by Captain PENDERGAST for Sir ABRAHAM HUME, in October, 1798, as above stated. This kind first sported, and produced some rose flowers at Mr. VERE's garden at Kensington Gore, two or three years after it was imported. It is the variety η, or Copper-coloured, of the second edition of the *Hortus Kewensis*, and the variety ι, Cuprea, or Copper-coloured, of SWEET's *Hortus Suburbanus*.

12. *The Spanish Brown Chrysanthemum*, called by some the Brown and by others the Scarlet. It grows shorter than all the others, bearing a few flowers with stems and footstalks more rigid than usual; it approaches the characters of the Rose and the Buff more than of any other, but it flowers later than those varieties, having the scent of Chamomile, though not unpleasantly strong. The flowers are a deep brown orange, deeper in the centre, which when very

brilliant might be taken for a dull scarlet; if the flower is weak, or the blossoms in decay or late, the centre of the flower is lighter, or even quite yellow; the florets laying compact and imbricate, and being short, the flowers appear flatter than those of either the Rose or the Buff; the expansion of the flower is from one to two inches, being smallest of the whole tribe yet known; the florets are not at all tubular, they are rather pale at the back, but this is not perceptible, because the flower growing fully upright, and the florets being flat, only present one surface to view. The leaves are large for the plant, with indentures not very deep, the lobes not standing separate, but over-lapping each other, the smaller divisions are blunt and pointed. It was introduced for Sir ABRAHAM HUME, in September, 1806, by Captain PENDERGAST in the Hope, of which ship he then had the command. It is the variety θ, or Brown, of the second edition of the *Hortus Kewensis*, and the variety $\varkappa$, Fulva or Brown, of Sweet's *Hortus Suburbanus*.

The above are the twelve varieties which I mentioned at the commencement of this Paper, and I have been thus particular in my descriptions of them, because a mistaken opinion is entertained, and that even by some good gardeners, that they all sport and change into each other. The shape of their leaves, if attended to, will shew the impossibility of such a circumstance, for, excepting those of the Purple and the Changeable White, which are alike, and those of the Rose and the Buff, which are also similar, the leaves of the rest differ from each other, and from these likewise. It is true, that the Purple sometimes shews a white flower, but so rarely that I have seen very few instances of it: the Rose also occa-

sionally produces a sporting branch, bearing the flowers of the Buff, which sports in a similar way into the Rose, but these are all the instances of such unsteadiness of character, which only takes place between kinds whose leaves are similar. The misconception relative to a greater variation, has arisen from the observers not being aware, how very remarkably the appearance of the flowers is affected by a good or bad season. The Quilled, the Superb, and the Tasselled Whites all require bright weather to preserve the purity of their appearance; they become tinged with red if the season is cloudy or dull, and especially as the blossoms decay. The Changeable White is affected in a contrary manner; unusual warmth of situation or climate occasions the exhibition of purple on its florets, which is in fact an effort of nature to restore itself to its original colour. With cold or decay the Sulphur Yellow gets a tinge of dull red, and then approaches nearer to the Golden Yellow, but is still decidedly different. The Rose, the Buff, and the Spanish Brown lose the brilliancy of their colours with bad weather, and the two latter become more yellow, but nevertheless, keep true to their characters.

I have quoted all the plates which have been engraved in our periodical botanical works of these beautiful plants, and lament that the whole have not been thus given to their admirers. Only five have yet been figured, these are the Purple, the Changeable White, the Quilled White, the Superb White, and the Golden Yellow.

In addition to the preceding twelve kinds, I now proceed to give descriptions of the two new varieties which flowered in the present autumn for the first time, having been introduced

last year from China by Captain DRUMMOND, for the Horticultural Society, as I have already stated. I have called the first the *Quilled Flamed Yellow Chrysanthemum*, and from its appearance this season, I am induced to hope it will be the finest of all the varieties we at present possess. It comes into flower soon after the Purple, and will therefore belong to the class of those which are intermediate between the early and the late ones. It seems disposed to be tall; its branches grow upright and compact, they are not very numerous, but bear a sufficient quantity of flowers, which, like most of the others, have the scent of Chamomile. The florets are all quilled, and of various lengths, most of them averaging two inches or more in length; they are striated, enlarging upwards so as to appear slightly club-shaped, and their extremity is contracted into a very small mouth, the edges of which are serrated; their general colour is pale yellow suffused with a tinge of pale flesh or flame colour, but those in the centre of the flower have more of the yellow; at the first appearance of the flowers the flame colour so much predominates, that they might be expected to be all of that hue. From their length, and weakness, the florets hang rather loosely forwards, filling up uniformly the whole interior of the flower, though in some specimens, on close examination, a disc of short yellow tubular florets may be seen in the centre; the florets are also rather curved, not growing quite straight, and as they all turn in one direction, in its expansion the flower appears as if twisted. The breadth of the blossoms has exceeded five inches, and this, as well on account of the unfavourableness of the last season, as from the want of strength of the plants, will probably be below the usual size

of a good flower in future years. The leaves are of moderate size, deeply indented, and have their smaller serratures sharp-pointed. Mr. Hooker has made a drawing of the variety in full flower, which I have now the pleasure to exhibit.

The other new one I have named the *Quilled Pink Chrysanthemum*. It is one of the late flowering kinds, and has produced but very imperfect blossoms at present, but we are enabled to form a judgment of what it will be when stronger, from the Chinese drawing of the variety, which is in the Society's Collection. The plant grows tall and upright. The florets are all quilled, with very minute openings at the top, and are of various lengths, rather club-shaped, increasing in size upwards from the base, the whole being beautifully tinged with a delicate pink; the expansion of the flower is considerable. The leaves are large, with wide and deep indentations, the serratures rounded, with blunt points; the whole of the under part of the leaves is unusually soft and velvety to the touch, being densely covered with short hairs.

As it is the object and wish of the Council of the Horticultural Society to make public the novelties they may acquire, of whatever description, with as much expedition as possible, plants of both these new varieties have been presented to every Nurseryman near London connected with the Society, so that in the next season it is hoped that being in the possession of so many skilful propagators, they will become more known and more plentiful than some of the others which have been longer established in the country.

The usual method of managing the Chinese Chrysanthe-

The Quilled-flamed Yellow Chrysanthemum.

Drawn by W Hooker.

mums is to keep them in pots; but strong plants in a warm and dry border of the flower garden in a favourable season, will succeed very well, especially if care be taken to select the sorts best suited for the purpose. It is necessary to renew them in the borders about every two years, for as they increase much by suckers from the roots, the plants, if left for a longer period, become unsightly, and produce small and imperfect flowers. Sometimes also the plants are injured, and rendered useless, in consequence of being thrown out of the ground by frost. The proper period for planting them in the open border is in March or April, they may be then turned out of the pots into the places where they are to remain, and will afterwards require nothing beyond the ordinary attention of watering, and protection from strong winds. All the earlier flowering varieties are of course the most eligible for this purpose, but the Purple, the Changeable White, the Rose and the Buff seem altogether the hardiest; I have observed fine plants of the Superb White also in the open air, the strength of its stem appearing to be of service in supporting it. When trained to a wall, all the kinds grow to a considerable heighth, but are not so handsome as when standing as single bushes. If turned out into the border of the Conservatory they thrive extremely, and attain unusual size and luxuriance.

Besides the advantage in point of climate which is given to the plants by keeping them in pots in a house, the power of mixing the different varieties together, and of keeping up a succession in full beauty (the different kinds which flower early being replaced by the later ones), is a very important inducement to cultivate them in this manner. Whoever has

witnessed the brilliant display of Chinese Chrysanthemums in the shop of Messrs. COLVILL, in the King's Road, Chelsea, in the months of October and November, especially in the season of 1818, which was peculiarly favourable, must have been struck with their beauty; these Nurserymen seem to have paid more attention to the Chrysanthemums than any others near London, and they have besides the credit of having produced to the English gardener the Purple variety, which was the first of the collection known to us.

The mode of propagation of these plants, pursued in the garden of the Society, is to take off in August a sufficient number of cuttings from the side branches of the flowering plants, and to plant them in shallow pans placed in a warm but shaded spot, and covered with a hand glass. The cuttings will strike and be well rooted in a month or six weeks, when they are shifted into sixty size pots, and put into a warm situation, where they remain until November, they are then placed under a frame for the winter. About the end of April they are shifted into thirty-two size pots, and set out in a well sheltered south border, for the summer, during which they are plentifully watered. As soon as the flower buds are formed, which is usually about the beginning of October, they are taken into the green-house, on the stage of which they are exposed as much as possible to the air, both night and day in good weather, but protected by the lights from wind, rain, and frost. The compost used for them is made of two-thirds rich turfy loam and one-third leaf mould, or decayed dung. The suckers thrown up from the roots may be separated, and thus the plants will be encreased, but those raised from cuttings are preferred, because

they have less tendency to produce suckers, which are unsightly. Although August is the best season to make the general propagation, cuttings of the branches or stem may be struck at any other period of the year.

Plants raised in pots in the manner described will generally have a single stem, but should never be allowed to carry more than two. As these, at the flowering season, will be of considerable height, they must be supported by sticks. If it be desired to have the plants with shorter stems, the pots should be placed on bricks, or otherwise detached from the ground through the summer, and they should be sparingly watered; but the consequence of this treatment will be the production of inferior flowers. The Chinese are represented to limit the production of flowers to a single one on each plant by the destruction of the other blossom buds, and in consequence the flower thus kept becomes considerably larger than we are used to have them.

The number of the varieties of these Chrysanthemums to be found in the gardens in China is very great indeed; the Society is in possession of forty original drawings, recently made in that country, from growing specimens, not above four of which are referable to those plants which have been now described. Twelve of these drawings represent white flowers, which are perhaps the least estimable, but those which have a permanent tinge of pink added to the white, are peculiarly beautiful; the remainder are made up of yellows, lilacs, reds, and purples, in great variety of appearance, with florets either perfectly quilled, expanded and long, or short, so as to form a globose flower. All those varieties which may be considered deserving of notice, and other new

ones yet unknown to us, we hope progressively to obtain. There are already fourteen unproved varieties in the country, eleven belonging to the Society, and three in the possession of Mr. Brookes of Ball's Pond, all of which will probably blossom next season; and though some may perhaps not turn out to be novelties, yet there cannot be a doubt but that much the greater part will increase the list of the varieties cultivated in England.

Pages numbered
355 through 362
missing
from book
at time
of scanning.

botanicus

LII. *Description of a Mode of Cultivating* Pines, *as practised in the Garden of Mr.* Thomas Jenkins; *F. H. S. at the Portman Nursery, New Road, St. Marylebone. By* William Hooker, *Esq. F. H. S.*

Read September 5th, 1820.

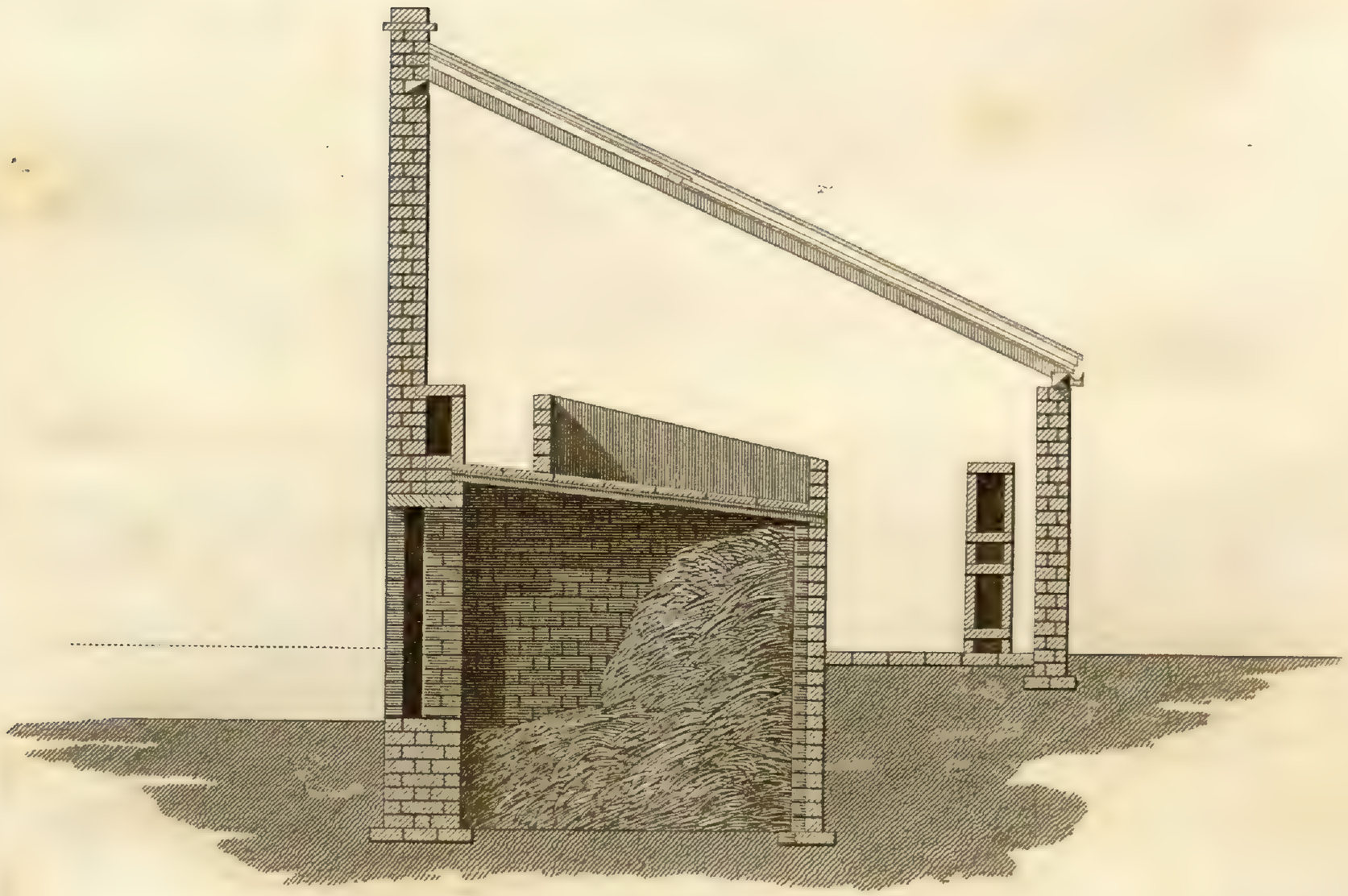
The importance which I consider attaches to any mode of cultivating plants which presents to the Horticulturist the means of lessening either the expense or difficulty attending the usual practice, has induced me to lay before the Society an account of a method of cultivating Pine Apples, without fire heat, recently adopted with perfect success by our worthy Member, Mr. Jenkins. The collection of Pine plants in his garden includes, I believe, nearly all those varieties which are most esteemed; and the greater part of these have ripened their fruit repeatedly, and in abundance; samples of several of which have been exhibited at the Meetings of the Society, and have proved that the general management of the plants is excellent. The plants, however, which are particularly the object of this Paper form but a small portion of the collection, being confined to a single house: and the fruit which has been this day placed on the table of the Society, is some of the first which has been ripened in that house, under what appears to me to be a new and advantageous plan.

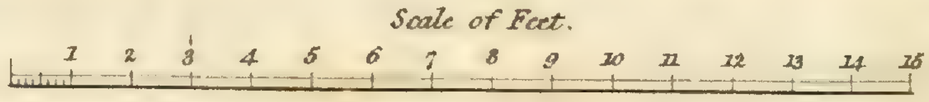
The house is twenty-nine feet long, and is constructed in

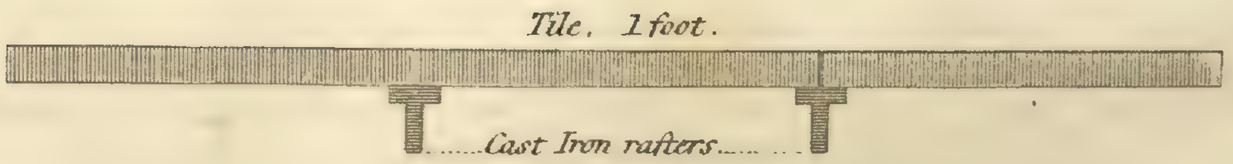
the usual manner, as regards the glazing, and proportion and size of the pit; there are flues in it, but these have never been used under the present management, and, in the construction of a new house for a similar purpose, would, of course, be wholly omitted. The heat imparted to the plants is produced solely by dung deposited in a chamber which occupies the space shewn in the accompanying Section. The top of the chamber is covered with tiles one foot square, supported by iron rafters, as represented in the plate; the joints being so closely cemented as to prevent the passage of the steam into the house. By this method the unsightly litter is kept from view, and the dung is removed and renewed, as occasion requires, through a door placed in the back wall of the house, which, except when any change is made in the dung, is kept constantly closed, so that the whole of the steam produced by the fermentation of the dung is confined within the chamber, and imparts its heat to the house through the medium of the covering of tiles. The plants, which are in pots of the usual size, are placed on the tiles which cover the chamber, and stand in four rows, in the order in which Pines are usually arranged in a tan pit, but are neither bedded in tan nor in mould.

The plants treated in the way above described are sixty in number, all bearing fruit, now nearly ripe; and, with the exception of a single plant of the Providence, also in fruit, are all of the variety well known under the name of the Queen Pine. They are remarkably clean, strong, and healthy; their leaves large, rigid, and well coloured, and in only one or two instances betraying the slightest marks of injury

Section of Mr. Jenkins' Pine Stove.







Drawn by Geo. Gutch.

Engraved by J.B Taylor.

from cold, though, during the last winter, the glazed covering was often frozen thickly over, and the thermometer within the house was sometimes as low as 40°, and usually at 43°.

The plants were placed in the house in September 1819, being then one-year old from suckers, and had been previously kept in frames heated by dung. The fruit of the whole is as perfect in size, form, and colour, as any I have ever seen, and some are particularly handsome, having the pips, as they are termed, swelled to an unusual size and flatness, the yellow being brighter and deeper, and the dark spots more clear and distinct, than is generally seen in the Queen Pine.

The management of the dung in the chamber has been as follows: when the plants were introduced into the house in September 1819, a quantity of fresh horse-dung was thrown on the bottom of the pit, and well watered; in a week afterwards this was piled against the front wall of the chamber, so as to look like the lining of a hot-bed, and a load of fresh dung was then thrown on the floor, and watered; and thus, from time to time, as heat was wanted in the house, the dung which had been laid on the floor of the chamber was thrown forward on the former heap, and new dung introduced and watered. The quantity of dung, and the intervals of its introduction, varied according to the greater or less degree of heat required. The temperature of the house was kept very low till January, when the actual forcing commenced, and then new dung was supplied once a fortnight. The dung, after it had laid some time piled

together, sunk so much that the chamber was not actually filled at the time when the fruit was ripening, so that the clearing of the chamber will not take place till after the crop is gathered. The peculiarity of the method consists in the application of the water to the newly introduced dung; by this it is kept in such an active state of fermentation as to give out heat sufficient for the purposes required.

LIII. *Observations on* Hybrids. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read February 6th, 1821.

Much difference of opinion appears to exist between my friend the Hon. William Herbert, and myself, relatively to the production of *Hybrid Plants*, he supposing that many originally distinct species are capable of breeding together, without producing mules (that is, without producing plants incapable of affording offspring), and I considering the fact of two supposed species having bred together, without producing mules, to be evidence of the original specific identity of the two. Our difference of opinion is, however, I believe, apparently much greater than it really is: for I readily concede to Mr. Herbert, that great numbers, perhaps more than half, of the species enumerated by botanical writers, may be made to breed together, with greater or less degrees of facility: but upon what sufficient evidence the originally specific diversity of these rests, I have never been able to obtain any thing like satisfactory information; and I cannot by any means admit, that plants ought to be considered of originally distinct species, merely because they happen to be found to have assumed somewhat different forms, or colours, in an uncultivated state. The Genus Prunus contains the P. Armeniaca, P. Cerasus, P. domestica, P. insititia, P. spinosa, P. Sibirica, and many others. Of these, I feel perfectly confident, that no art will ever obtain offspring (not

being mules) between the Prunus Armeniaca, P. Cerasus, and P. domestica: but I do not entertain much doubt of being able to obtain an endless variety of perfect offspring between the P. domestica, P. insititia, and P. spinosa; and still less doubt of obtaining an abundant variety of offspring from the P. Armeniaca and P. Sibirica. The former, the common Apricot,* is found, according to M. Regnier, (for a translation of whose account, we are indebted to Mr. Salisbury),† in a wild state in the Oases of Africa. It is there a rich and sweet fruit, of a yellow colour. The fruit of the P. Sibirica, seeds of which came to me last year from Dr. Fischer of Gorinki, is, on the contrary, I understand, black, very acid, and of small size: but nevertheless, if these apparently distinct species will breed together, and I confidently expect they will, without giving existence to mule plants, I shall not hesitate to pronounce these plants of one and the same species; as I have done relatively to the Scarlet, the Pine, and Chili Strawberries. Botanists may nevertheless, if they please, continue to call these transmutable plants, Species; but if they do so, I think they should find some other term for such species as are not transmutable; and which will either not breed together at all, or which, breeding together,

* The early period at which the Apricot unfolds its flowers leads me to believe it to be a native of a cold climate: and I suspect the French word Abricot, the English Apricock, and the African Berrikokka, to have been alike derived from the Latin word Præcocia, which the Romans (there is every reason to believe) pronounced Praikokia, and which was the term applied to early varieties of Peaches, which probably included the Apricot. The Greeks also wrote the Latin word, as I suppose the Romans to have pronounced it, Πραικοκια. Hardouin's Edition of Pliny, Lib. 15. Sec. xi.

† See Horticultural Transactions, vol. iii. Appendix, page 23.

give existence to mule plants. I do not, however, feel any anxiety, or wish, to defend my own hypothetical opinions upon this subject: on the contrary, I shall be most happy to see them proved to be erroneous; and my chief object in addressing the present communication to the Horticultural Society is to point out a circumstance which is more favourable to Mr. Herbert's opinions, than any other which has come under my observations.

I sent to the Society, some years ago, a fruit which sprang from a seed of a Sweet Almond and the pollen of a Peach blossom, and which in every respect presented the character of a perfectly melting Peach. When the tree, which afforded that fruit, first produced blossoms, I introduced into them the pollen of another Peach tree, with the view of obtaining more improved varieties of the Peach of this family: and the necessary preparation of such blossoms prevented my noticing an imperfection, which I have since observed in them. Little or no pollen is ever produced in them; and though the tree has borne well subsequently, upon the open wall, and has produced perfect seeds without any particular attention having been paid to it, I suspect that its blossoms have been fecundated by those of some adjoining Nectarine trees. Having, however, often observed, that varieties of the same acknowledged identical species, when one was in a highly cultivated, and the other in a perfectly wild state, did not readily succeed, when grafted upon each other, owing, probably, to the very different qualities of their circulating fluids, I conceived it possible that the same causes might have prevented a perfect union at once taking place between

the Almond and Peach tree. I therefore waited till I had an opportunity of observing, in the last summer, the blossoms of a second generation, which proved in every respect, as imperfect as those of the first tree, and like those, afforded fruit and perfect seeds with the pollen of an adjoining Nectarine tree. This result, which I did not anticipate, appears interesting: but I hesitate in drawing, at present, any inferences from it.*

The vegetable and animal worlds present so much similarity in almost every thing which respects the generation of offspring, that the extent to which mules are permitted to exist in the animal world, might have been expected to point out the utmost limits of their existence amongst plants; for every animal is driven by its instinctive feelings to seek its proper mate, whilst an unrestrained and unlimited intercourse between plants is carried on by the incidental operation of winds and insects. But if the fruit tree obtained from the Almond and pollen of the Peach be a mule, nature has already permitted it to propagate offspring to an extent scarcely, if at all, known in the animal world. I have, how-

* Since the foregoing observations were addressed to the Horticultural Society, a tree which sprang from a seed of a Sweet Almond and pollen of the early Violet Nectarine, has produced a profusion of perfectly well organized blossoms, with abundant pollen; after having, in the three preceding years, afforded imperfect blossoms only. If such pollen prove efficient, which I see no reason to doubt, either the specific identity of the Peach and Almond, or the transmutability of the two species, will be proved. But if the Peach be an originally distinct species, where could it have lain concealed from the creation to the reign of Claudius Cæsar?

ever, heard it asserted, that female mule birds have been known to breed under similar circumstances; that is, with a male of the same species as the male parent of the mule: but upon trying the experiment, it did not at all succeed in my hands. The mule birds laid eggs, apparently well organised, upon which they sat; but the eggs soon became putrid; and I had good reason to believe, that the first pulse of life had never beaten in any of them.

If hybrid plants had been formed as abundantly as LINNÆUS and some of his followers have imagined, and such had proved capable of affording offspring, all traces of genus and species must surely, long ago have been lost and obliterated; for the seed vessel even of a monogynous blossom often affords plants which are obviously the offspring of different male parents; and I believe I could adduce many facts, which would satisfactorily prove, that a single plant is often the offspring of more than one, and, in some instances, of many male parents. Under such circumstances every species of plant which, either in a natural state, or cultivated by man, has been once made to sport in varieties, must almost of necessity continue to assume variations of form. Some of these have often been found to resemble other species of the same genus, or other varieties of the same species, and of permanent habits, which were assumed to be species; but I have never yet seen a hybrid plant, capable of affording offspring, which had been proved, by any thing like satisfactory evidence, to have sprung from two originally distinct species; and I must therefore continue to believe, that no species capable of propagating offspring, either of plant or

animal, now exists, which did not come as such immediately from the hand of the Creator.

Having spoken, in the preceding account, of mule birds, I will take this opportunity of recording a very singular circumstance, which came under my observation, whilst I was engaged in the experiments which I have stated. A person informed me that a farmer, who resided a few miles distant from me, possessed a mule bird, which was bred between the common hen, and the wood-pigeon; and which my informant had seen, and described with accuracy; I took, in consequence, the earliest opportunity of seeing the farmer, and the supposed mule bird; because I thought that nature had strictly prohibited the production of mules between species so distinct, and had usually made the death of the female the price of the attempt. The information I obtained was, that the children in his house (his infant brothers and sisters), had reared a young wood-pigeon and a motherless chicken together; that these became much attached to each other, and appeared to have paired, the wood-pigeon constantly paying court to the young hen, as he would have done to a female of his own species. The hen subsequently laid eleven eggs, which she sat upon, and produced one offspring, the bird in question. It was wholly without comb, and it had soft turgid nostrils, extremely similar to those of a wood-pigeon; and the whole profile of its head, exclusive of the point of the beak, bore a most striking resemblance to that of its supposed male parent. It, however, certainly was not the offspring of a wood-pigeon, nor a mule; for it bred freely. I ought to have pre-

served the bird, which was offered me, and perhaps I convict myself of an act of unpardonable stupidity in not having done so. But it was a great favourite with the children who possessed it; and I did not like to deprive them of it. The animal physiologist will draw his own conclusions respecting these singular facts; I do not feel qualified to give an opinion.

LIV. *On the Cultivation of the* Ranunculus *and* Anemone. *In a Letter to the Secretary. By the Rev.* William Williamson, *C. M. H. S.*

Read November 21st, 1820.

Dear Sir,

I find great pleasure in complying with your request, that I would send you an account of the method which I have practised for some years of cultivating the *Ranunculus* and *Anemone;* and hope that some of the observations may prove useful to those Members of the Society who may be desirous of growing these beautiful productions of nature. I may premise that the culture of these two sorts of flowers is so much the same, that it seemed superfluous to make them the subject of different papers; it is, however, necessary to state that the following observations are strictly applicable to the Ranunculus only, though the general detail may be considered as equally suitable to both.

In order to grow these flowers both numerously and of a large size, florists usually employ a very rich soil; but in making the soil so very rich, it is in general rendered so light as wholly to destroy the effect intended to be produced. I am acquainted with several persons who are in the constant habit of cultivating these plants, and they all agree that they cannot with certainty exhibit a fine bloom from the same roots during successive years; the cause of which, I conceive, may be thus explained. In perennial fibrous

rooted plants, the strength of the blossom depends upon the impulse that is given to the plants in the season in which they flower, but not so in bulbous roots; their strength depends upon the quantity of sap that is laid up in the roots by means of their foliage during the preceding year. Now it is generally supposed that the roots of the Anemone and Ranunculus are very impatient of frost, and they are, in consequence, planted so late in the spring, that there is not sufficient *moisture* (which is so very essential in the early stages of their growth) nor even *time* for the roots to throw out such a sufficiency of leaves as to insure the future strength to the roots, before the north-east winds set in, which in this country, at least of late years, have generally prevailed during the month of March, and sometimes much later: these winds, which dry the soil very rapidly, must be prejudicial in proportion to the lightness of the compost; and when roots are stunted in the earlier stages of their growth, the bloom of the present year has but little beauty; no skill can possibly make them exhibit a fine bloom in the succeeding season; and frequently two or three years must elapse, before sufficient strength is given them to cause them to blow in perfection.

I therefore conceive that these roots require not only a rich but a compact soil; and were I to recommend any compost to be made for them, it would be a stiff loamy clay, enriched by the addition of at least one-fourth part of good rotten dung: but if the soil of the garden be of a loamy quality no manure is necessary. I find that of my own garden to be so congenial to them, that I have never yet failed to exhibit a fine bloom; it is a rich hazle loam of about two feet in

depth, having a brick earth for the subsoil. The ground is roughly dug in October, but not deep; so that the lower part of the soil is not moved at all; the fibres of the roots, when planted, soon penetrate this compact soil, and draw moisture from it, and consequently flourish, whatever may be the state of the upper part of the bed. I frequently plant the roots in the same place for several years successively; the soil then, of course, requires manure, and should be dug deeper, but as early as possible, that it may become close and firm before the roots are planted, and also that the manure may be more perfectly blended with the mould.

It has been remarked, that we seldom have a second frost of much intensity or duration; it has therefore been my usual practice to plant the roots immediately after the first severe frost; at all events, I never delay the planting after the 10th of February. Before the leaves appear, I usually move the surface of the ground, if practicable, with a Dutch hoe; both to destroy the weeds, and also to make the surface light and porous, for it is found by experience, that those plants flourish best, when the upper part of the soil is continually moved, and after they do appear, a small hand-hoe applied between the rows is found extremely beneficial.

The injury which the roots of the Ranunculus and Anemone are liable to sustain by frost, is not, I conceive, very great: I have proved by several experiments, that they will bear a great degree of cold, provided the soil is not naturally wet. The whole of mine, amounting to many thousands, were last spring unexpectedly exposed to a severe frost, the thermometer standing at 11° below the freezing point, and I am not aware that any of them perished. It should however be

mentioned, that it was a hoar-frost, which is not so prejudicial to many plants as what is termed a black frost, though its absolute severity may be much greater. A great majority of these roots were seedlings, which I find are more able to endure hard weather than our older varieties; they were totally unprotected, and many rows were planted so near the surface, that their crowns were distinctly visible. When the roots decay, it is not in general during the winter, but late in the spring, after the vernal rains; it therefore seems extremely probable, that were they protected in the winter and spring during heavy and continued rains, by a covering of sail-cloth raised to some distance from the ground, they might be exposed to the severity of frost without fear of losing them. This is, however, only a conjecture; but it merits a trial; for if they are planted before the winter, and survive it, they not only bloom earlier and finer, but the roots are more increased both in number and size.

As to the most proper time of taking up the roots, I am again constrained to dissent from general opinion: I consider that we usually suffer them to remain too long in the ground after the bloom is over. If the sap of the present year is to afford nourishment for the foliage and bloom of the next we ought to accumulate the sap as much as possible in the root: now the fibres of the root must begin to decay, before the foliage changes at all, for one is the consequence of the other; reason therefore seems to point out to us the propriety of taking up the roots immediately that the foliage begins to change, that the sap which is contained in the leaves may remain in the root and not pass into the earth through the fibres that still are attached to it. For the sake of neatness

I have usually washed the roots after they are taken up, though it is a matter of no real utility; they should at first be placed upon the floor of an airy room, where they may dry gradually, and then be separated, and securely laid by, ready for planting in the following season.

The increase of these plants is effected by three different methods, by seed, by offsets, and by cutting the roots.

The only method by which new varieties can be obtained is from seed. It is well known that the seed which is produced from those flowers which are already partly double, is more likely to produce either double or semidouble flowers, than the seed from single ones. The first object is therefore to procure roots which produce *semidouble* flowers; for were they quite double no seeds could be had from them, the stamina being entirely destroyed by the impletion. I have heard many persons complain of the difficulty they experience in making the seed vegetate; this arises from bad management; and if the following directions be attended to, I am convinced success will be certain. In the first place the seeds must be *sown early*, for moisture is essential to their vegetation: and as they frequently remain six weeks or two months in the ground before they come up, it is absolutely necessary to sow early in the year to secure a certainty and continuance of moisture. I have sown the seed from the beginning of September to the end of January, with various success: if the winter be mild the autumnal sowing is much to be preferred. My practice now is to sow half my seed in the autumn; it then appears in the beginning of November, and the other half as early as in the month of January as the weather will allow; the first sowing will succeed,

should the winter prove mild, but that of January is almost certain to do well, though the roots will be much smaller than those raised from the autumnal sowing.* Another point to be attended to is not to sow the seeds *too* deep; the least covering will be sufficient. I need scarcely mention the necessity of a frequent and careful weeding by hand, during the time the plants are growing. When the foliage decays, which will be early in June, the ground ought to be entirely pared to a sufficient depth and afterwards sifted, that all the roots may be certainly saved, for the smallest most frequently produce the best flowers. By these methods, I have often raised many thousands in one year; and by continual selection of the best seed, I now have them in such perfection, that out of many thousand new seedling roots, which I bloomed last year, I had only one absolutely single one, that is, with five petals, but I had many full double flowers of great beauty.

The semidouble flowers I continue to bloom for several years; as I find that I cannot appreciate their real qualities under two or three years, for though they are only semidouble when they first blow, they may afterwards become double by skilful cultivation. These flowers become double in two ways; first, by the multiplication of their petals; such are obtained at once from seed, and seldom or ever vary from what they were originally: secondly, by the conversion

NOTE.—* March 18, 1821. I sowed a large bed, containing several perches, on the 22d September last, the seed vegetated in the latter part of October, and the young plants continued in a growing state, till they were entirely cut off by the frost in the latter part of the year: the other half I sowed as soon as the weather admitted in January last; they are now just appearing, and likely to do well.

of the stamina into petals; this is effected entirely by skilful culture, and such are generally the fullest and most beautiful flowers; as the colours of the petals thus formed will always be the same as the stamina, which are frequently of a different colour from the proper petals. Those beautiful Anemones with rows of petals of different colours, which have lately been imported from Holland, have been produced in this manner; they are however liable to return to their original state, without great skill and attention.

The method of increase by offsets is well known, and is chiefly resorted to in perpetuating varieties of known excellence.

There is another way of increasing these plants, which is not so generally known; that is, by cutting the root into parts. This is chiefly used to preserve any particular variety raised from seed, and of which only that root is in existence. In minutely examining the crown of a Ranunculus several small protuberances will be found; from each of which a shoot will arise, and the root may therefore be divided by a sharp knife into as many parts as there are protuberances, and thus the danger of losing the variety is much diminished. These cuttings will not shew any blossom in the first year, but a perfect root will be obtained from every cutting, and these will blow in the following year.

I will only now add an account of my endeavours to obtain double flowering roots of the Anemone, and some experiments made to ascertain the best time of planting the roots.

Being fully convinced that new double varieties of the Anemone might be successfully raised in this country, I endeavoured to procure some semidouble flowering roots, but

being unable to get them, I was under the necessity of raising them myself. I therefore, year after year, sowed the seed of the Anemone coronaria, but it was several years before I observed the least disposition in the seedlings to multiply their petals; I however persevered in sowing the seed, and at last raised a few that had one petal more than the usual number; the seeds of these I saved, and sowed, and by perseverance in the same course, have now several varieties that have six or seven distinct rows of petals; and I am confident, that by continued selection, I shall be able to produce double and semidouble flowers of the Anemone with the same facility as I do of the Ranunculus.

In the autumn of 1818, I divided nine ounces and a half of double Anemones into two equal parts, equal in weight and number of roots; each part weighed four ounces and three quarters, and contained one hundred and twenty roots. The first half was planted October 10th, 1818, and when taken up they weighed thirteen ounces. The other half was planted February 10th, 1819, contiguous to the others, and when taken up they weighed only five ounces and a half, making a difference of seven ounces and a half in favour of those planted in the autumn, the flowers of which were also larger and more numerous. The extreme mildness of the winter was, no doubt, favourable to the autumnal planting. On the 28th January, 1820, I again planted the whole of the eighteen ounces and a half, but found, when they were taken up this summer, that they weighed only ten ounces. I therefore conclude, that, subject to the risk of damage by severe frost, which I conceive not to be great, that the autumnal planting

is preferable, provided that the sub-soil be not too retentive of moisture; in that case they would inevitably perish. This opinion is also strengthened by the following experiment. In the summer of 1819 I took up a bed of Anemone roots; but found in the autumn, that a considerable number were left in the ground; early in October these were transplanted, whilst the others, which had been taken up in the summer, were planted a few days before Christmas. The transplanted roots survived, while the whole of the others perished.

I am, dear Sir,

Your obedient humble Servant,

WILLIAM WILLIAMSON.

Westbere, near Canterbury,
9th November, 1820.

POSTSCRIPT.

March 18, 1821. My Ranunculus roots were last winter again exposed to a severe frost, the thermometer standing at $10\frac{1}{2}^{\circ}$ below the freezing point, and as they were in a much more forward state than usual, owing to their being planted earlier, I was apprehensive, lest they might be injured; but upon a careful examination, I cannot find that they have received any damage whatever.

LV. *Description and Account of the different Varieties of the* Garden Carrot. *By Mr.* William Christie, *Under Gardener to the Horticultural Society.*

Read March 20th, 1821.

During the two last seasons, seeds of all the sorts of *Carrots* cultivated for culinary purposes were sown in the garden of the Society, with the intention of ascertaining their qualities and characters, and of distinguishing the different kinds from each other. Having, in consequence of the instructions given me, particularly directed my attention to these roots, I submit to this Meeting my observations on them.

The Garden Carrot is supposed to have been obtained originally from the Wild Carrot (*Daucus carota* of Linnæus), and the different sorts have probably been produced by selection from the original variety, since we are informed by Miller that he in vain endeavoured to improve the wild plant by cultivation in a garden, and that he could not succeed in ameliorating the dry and hard quality of its root.

The seeds of the various sorts which were sown for the purposes of this enquiry, were received not only from English seedsmen, but were imported from France and Holland; and it will appear that some of the kinds hereinafter described, which are cultivated in foreign countries, are not generally known to our English gardeners. Among those which have been usually grown in England, different names are fre-

quently given to the same kind, and even different sorts are sometimes found with the same name. This is not surprising, when it is considered that none of our popular works on gardening, at least as far as my observation has reached, sufficiently distinguish the varieties.

Most gardeners are well acquainted with the obvious division of the Garden Carrots into those having roots generally short, nearly cylindrical, and terminating abruptly and bluntly, and those whose roots are long and spindle-shaped, tapering gradually to a pointed extremity. The first are commonly called the *Horn Carrots*, and the latter are distinguishable as the *Long Carrots*. The Horn Carrots are preferable for early use, and generally have a more delicate and agreeable flavour; they are said to be suited for general cultivation in shallow soils; but I conceive, in such situations it would be more advantageous to sow a short-rooted variety of some of the Long Carrots. The Long Carrots are grown where large crops are wanted, and for winter consumption.

Of the Horn Carrots I make three distinct kinds:

1st. *The Early Red Horn Carrot.* This is the *Carotte rouge courte hative* of the French, and the *Early Short Red Carrot* of the Dutch; it was received from Messrs. Beck and Allan, as the Scarlet Horn. The leaves are dwarf; the root short, thick, and nearly cylindrical, with few fibres, ending very abruptly, and terminated by a long slender tap root; the flesh is reddish, approaching to orange, and the heart, when young, is usually of a darkish red, when older, of a pale yellow. This is the soonest ripe of any, and best adapted for forcing, and early crops; it is probably kept distinct from the next only by careful selection.

2d. *The Common Early Horn Carrot.* This is the kind generally grown in England as the Early Horn. The leaves are moderately long; the root grows much larger than the preceding, is thick at the top, and though tapering a little, still ends abruptly, and is terminated with a long fibrous tap root. The flesh is reddish, and the heart is yellow. In flavour this and the preceding are similar, and are greatly preferable for summer use.*

3d. *The Long Horn Carrot.* The *Long Red Carrot* of the Dutch; it was not in any collection of seeds from other places, but came, both in 1819 and 1820, from Messrs. SCHERTZER and Sons of Haarlem, with the same name. The leaves are moderately long, slender, and not numerous; the root is long and cylindrical, with rather an uneven wrinkled surface, having a few small fibres proceeding from it in various parts, ending abruptly, and terminated by a long small tap root. The flesh is reddish orange, with a small heart, almost similar in colour to the flesh. This Carrot is a most desirable summer kind, of excellent flavour, very juicy and delicate.

There appear to be six distinct kinds of Long Carrots, principally distinguished from each other by the colour of their roots.

1st. *The White Carrot*, or *Carotte blanche* of the French. The leaves are of moderate length, the root rather short, thick at the top, and tapering quickly to its extremity; the flesh is perfectly white, the heart whitish, and separated from

* I have heard of a Carrot grown in the West of England, under the name of the *Short Orange Carrot*, but it is not in general cultivation; it may perhaps be the Early Horn.

the flesh by a very pale yellow ring. This, when dressed, is a very delicate root, but it is not so high flavoured as others; it is best for autumnal use, as it does not keep well in store. This kind came true from the French seeds only; those which were called white in other collections were the long yellow.

2nd. *The Yellow Carrot*, or *Carotte jaune* of the French. It came to us from M. VILMORIN only. The leaves and the shape of the root are like the preceding, but the flesh is pale yellow, inclining to orange, and the colour of the heart is nearly the same, with a darker shade proceeding from the ring which divides the flesh from the heart. It is esteemed in France, but does not promise to be of much value here.

3rd. *The Long Yellow Carrot*, by which name it is known in Holland; it is the *Carotte jaune longue* of M. VILMORIN, and was sent from English seedsmen as a White Carrot. The leaves are tall, with strong stems; the root long and slender, but still attaining to a great size, tapering slowly to its extremity; the flesh and heart are pale yellow, except a small ring between them, which is darker. This is a coarse root, of inferior flavour, but desirable, on account of its size, for field cultivation, and to be applied to the feeding of cattle.

4th. *The Long Orange Carrot*, by which name it is well known in England, has the name of the *Sandwich Carrot*, being much grown in the vicinity of that place. In France it is called *Carotte rouge pale de Flandres*. The leaves are long; the root large, and of moderate length, thick at the top, tapering quickly but regularly to its extremity. The flesh is orange, with the heart pale yellow.

Though certainly inferior to the next sort, this Carrot appears to be the one more generally used than all the others.

5th. *The Long Red Carrot*, or *Carotte rouge longue* of France. The leaves are of moderate length, the roots very long and large, tapering gradually to their extremity; the flesh is reddish, with a yellow heart. This is the most useful of the Long Carrots, and is the kind most proper to be cultivated for winter use. It is this sort which is chiefly grown about London by the market gardeners, and is known by the name of the *Chertsey*, and the *Surrey Carrot*, from the circumstance of great quantities of it being brought to the markets of the metropolis from Chertsey and the county of Surrey.

6. *The Purple Carrot.* This kind, though mentioned by several writers, and even in some of the oldest gardening books, seems to have been long disused here, but is known in France as the *Carotte violette.* The leaves are tall; the root is of moderate size, thick at the top, and tapering suddenly; the outer part of the flesh, for about a quarter of an inch in thickness, is deep purple, the inner part light yellow, and the heart dark yellow; but it sometimes is light yellow, and divided from the flesh by a dark yellow ring. This does not rank high in point of flavour, and will perhaps only be cultivated on account of its singular appearance. The French consider it the sweetest of all the kinds, but complain that it is apt to run to seed in the year in which it is sown; it is cultivated in Spain, from whence it was received by M. VILMORIN.

In addition to the preceding nine sorts, belonging to the two chief divisions of Horn and Long Carrots, there is an-

other variety which, though a novelty in the south of England, has been some years known in the north. It is called the *Altrincham Carrot*, from a place of that name in Cheshire, where it was probably originally grown; it was first sent to the Society by JOHN WEDGEWOOD, Esq. and is certainly deserving of being generally recommended. It is known in some places as the *Superb Carrot*, also as the *Green topped Carrot*, from the top of the root, which to the extent of about two inches grows exposed above ground, being of a green colour. If its place in the above arrangement were to be decided by its length of root, it ought to be classed amongst the Long Carrots, but its mode of growth is different from all those, and its flesh, which is very sweet, as well as brittle, assimilates more with the Horns. The leaves are long; the root attains a very great size, and tapers gradually, but generally ends a little abruptly, and is terminated by a small tap root; its surface is rather irregular, and wrinkled; the flesh is of a bright orange colour, with a small dark-coloured heart, shewing some faint marks of yellow.

Carrots for large crops are usually grown where the soil is deep and sandy; but whenever they are sown on fresh ground, well prepared by deep trenching, a heavy produce will always be gained in a small space.

LVI. *Notice relative to the Flowering of the* Agave Americana *in the open Air, in the Garden of* James Yates, *Esq. at Woodville, near Salcombe, in Devonshire. In a Letter to the Secretary. By* Abraham Hawkins, *Esq. F. H. S.*

Read February 6th, 1821.

Dear Sir,

The *Agave Americana*, or Great American Aloe, mentioned in my Letter of the 21st October,* 1811, as then growing in the open ground at Woodville, near Salcombe, Devonshire, the residence of James Yates, Esq. and as likely to rival the one which flowered at the same place in 1774,† has fulfilled expectation, and has appeared, in the past season, in all the splendour of its celebrated predecessor.

Mr. Yates himself states to me, that this Aloe was planted at Woodville in 1804, when it was two or three years old, and only about six inches high. Placed in the open ground, within a few yards of the sea-shore, yet elevated forty or fifty feet above the level of the water, it never had any cover, shelter, manure, or cultivation. In 1812, it was more than five feet high, and it grew during that summer nearly the eighth of an inch daily. In 1820, it measured between ten and eleven feet in height, and covered a space, the diameter of which was sixteen feet, the leaves, close to the stem, being nearly nine inches thick. In the beginning of June last, the centre leaves assumed, at the apex, a pale sickly colour, and

* See Horticultural Transactions, vol. i. p. 243. † Ibid. p. 176.

the plant was thought to be dying; but in about seven days a stem made its appearance, resembling a head of Asparagus of immense size, which, during six weeks, grew at the rate of three inches a day, and then gradually diminished in progress, but not till it had attained the elevation of twenty-seven feet from the ground, which was about the middle of September.* As the stalk advanced, it threw out lateral shoots, which did not shew flowers for some time; but these ultimately were produced in great profusion. The two lowest branches first displayed them on the 3d of September; and others came out in succession from the beginning of October to the end of November, when they all began to lose their colour, and to decay.

There were upwards of forty flowering bunches, each with between three and four hundred flowers, making, in all, above sixteen thousand blossoms. As the stem grew, the large leaves below it began to wither. Mr. YATES's account to me of the plant, on the 29th of this month, closes with these words: "the plant is as erect as ever, with all its lateral branches and bunches quite perfect; but the yellow flowers are gone, and the appearance of the clusters is black."

The following summary of the age and dimensions of this plant may be worthy of record. Age twenty-one years. Height from the earth when in blossom twenty-seven feet. The lateral branches, beginning twelve feet above the root, were in number forty-two, the lowest projecting two feet

* A representation of a branch in flower, as well as a miniature of the whole plant of an Agave Americana, in full blossom, has been published in the *Botanical Repository*, Plate 433.

from the stem, and gradually diminishing to about a foot or nine inches in length at the top. The stalk, where the side branches commence, is twenty inches round, or near seven inches in diameter, gradually tapering to the apex. The bunches of flowers (or at least those next the bottom) are from a foot to fourteen inches in breadth.

It is with pleasure I add, that Mr. YATES has at present two fine young Aloes in his lawn, about ten perches from the sea-cliff, which are likely to be larger than the one above mentioned.

I am, dear Sir,

Your obedient Servant,

ABRAHAM HAWKINS.

Alston, near Kingsbridge,
31*st January*, 1821.

LVII. *Account of the Mode of treating* Pine Plants, *so as to make them produce Fruit within the year. By* Peter Marsland, *Esq. F. H. S.*

Read 5th December, 1820.

The success which has attended my mode of treating *Pine Plants* in my garden at Woodbank, near Stockport, so as to insure the production of fruit within twelve months from the cutting of their previous produce, has been so perfectly satisfactory that I am tempted to lay an account of it before the Society, in the expectation that other cultivators of the Pine Apple may be induced to adopt it.

The Pines which I had the honour to exhibit to the Society on the 17th of October last,* had been grown in the manner I am about to describe, and though not of the largest description, yet I believe, that as far as beauty of form and richness of flavour are concerned, they would not yield to fruit of more protracted growth.

In November 1819, as soon as the fruit had been cut from the Pine Plants, which were then two years old, all the leaves were stripped off the old stocks, nothing being left but a single sucker on each, and that the strongest on the

* The varieties exhibited were the New Providence and the Globe; but the Black Antigua and the Enville were also produced in a similar manner, in the present season. Queen Pines produced in the same way were exhibited at a Meeting in the last season, and were noticed in the Transactions, page 52, of this volume.

plant; they were then placed in a house where the heat was about sixty degrees of FAHRENHEIT, and there they remained till March, 1820. At this period the suckers were broken off from the old stocks, and planted in pots from eight to twelve inches in diameter, varying according to the size of the sucker. It may be proper, however, to observe, that the length of time which the young sucker is allowed to remain attached to the mother plant, depends in some degree upon the kind of Pine; the tardy fruiters, such as the Black Antigua, and others, require to be left longer than the Queen, and those which fruit readily.

After the suckers had been planted, they were removed from the house where they had remained while on the old stock, to one in which the temperature was raised to seventy-five degrees. Immediately upon their striking root the largest of the suckers shewed fruit, which swelled well, and ripened between August and November, being, on the average, ten months from the time the fruit was cut from the old plant, and seven months from the time the sucker was planted. The fruit so produced, though, as may be expected, not of the largest description, I have invariably found to be richer and higher flavoured than that grown on older plants. The suckers of inferior strength, will not shew fruit in the same season, but in the following they will yield good fruit, and strong suckers for a succeeding year's supply. Those suckers are to be preferred which are produced on plants that have ripened their fruit in November, for those taken from plants whose fruit is cut in August, or earlier, are apt to shew fruit in January or February while

yet remaining on the mother plant. But whenever this happens, the sucker should be broken off immediately upon being perceived, and planted in a pot so as to form a root of its own, to maintain its fruit.

LVIII. *Account of a successful Method of managing* Aquatic *and* Bog Plants, *as practised in the Royal Botanic Garden at Munich. By the Chevalier* Francis de Paula Schrank, *Foreign Member of the Horticultural Society.*

Read January 16th, 1821.

In all botanic gardens contrivances are to be met with for cultivating *Aquatic Plants*, and in most of them, places are also set apart exclusively for *Bog Plants*. The former usually consist of ponds of larger or smaller size, which frequently are lined with brick-work, or masonry ; or merely of basins or reservoirs, in which the water for watering the garden is collected, and wherein the plants themselves, either in tubs or pots, are plunged at greater or less depths, according to circumstances.

All these methods are, however, attended with great inconveniences: some aquatic plants having very considerable roots, do not well admit of being confined in small tubs or pots ; at least these tubs and pots, when filled with growing plants, and the earth that surrounds them, become too heavy to be properly managed. Besides, if the basins are so constructed as to receive the water from artificial fountains, or jets, the fall of the tumbling water necessarily disturbs the vegetation of the plants which it reaches, and spring water is at all times too hard for the nourishment of plants ; for

which reason, in basins of this decription, let them be ever so much exposed to the sun, Confervæ are rarely produced, provided the height of the jet is in due proportion to the diameter of the basin.*

For these reasons ponds are preferred, which are either lined to a certain depth with a thick coat of clay, or made water-tight by means of masonry or brick-work; they are then filled with mould, and the plants set in them. But such ponds, while they take up far too much room, which might be better employed, do not completely answer their object. For as plants are cultivated in a botanic garden solely for the purpose of being studied with the greater ease, the edges of these ponds only can be planted, the centre part being out of reach; this space consequently is lost to the garden. If the pond be freely exposed to the sun, without any considerable current in the water, it may be filled with different species of green Confervæ, which will spread to the edges of the pond, render the plants that grow there foul, and if they happen to be of a tender nature, even destroy them.

It might possibly be contrived that the ponds being made small, the centre might be reached, but another inconvenience remains unavoidable, arising from the plants themselves. Almost all water plants have creeping roots, in some (as *Menyanthes trifoliata*) the creeping stems often change into roots; it therefore happens that the plants placed in a pond soon grow confusedly and wildly through one another; the small, the tender, or, if I may say so, the modestly growing

* These artificial fountains, or water-works, to which the author alludes, are in modern times not much seen in Engalnd, but they still form a great ornament to the gardens on the Continent.

ones, being displaced, or at least hidden from the eye: at the same time the narrow bridges, particularly in large ponds, which one might think of constructing, would require to be too close together, if designed both to facilitate the examination of the plants growing in the pond, and to afford security to the botanist.

The botanic garden at Munich was originally laid out by the Chevalier SCHELL, Keeper of the Royal Gardens. His object, in this undertaking, was to establish the main points, and to provide for what was essentially necessary, at the same time leaving room for such future improvements, as might appear, according to circumstances, requisite and advisable. In this state the garden was intrusted to me. I found it incumbent upon me, at the outset, to represent to the Government, that I felt the want of two things in this garden, otherwise admirably laid out, viz. a rock work, and a place for the growth of aquatic and bog-plants. The Chevalier SCHELL was accordingly charged to supply both those wants, and to consult with me upon the subject. The plan for a rock work, as applicable to a botanic garden, I have submitted to our Academy of Sciences, in whose Transactions it will appear. With respect to the aquatic plants, I communicated to the Chevalier SCHELL the difficulties above mentioned, owning, at the same time, that I knew of no remedy. He proposed to me canals, or trenches, constructed of brick-work or masonry, to which I objected their want of durability, and their liability to be disjointed and destroyed by the plants themselves. For whereas, according to BRUGGMAN's accurate observations, plants secrete through their roots fluid particles, which are of an acid nature; as soon

as the roots come in contact with the cement or mortar of the brick-work the lime is gradually dissolved, and the roots penetrating through the sides loosen the bricks, and thus gain more air. By this means the plants get, by degrees, into the same kind of entanglement and confusion, which I have adverted to in speaking of the ponds, since the sides of the trenches cannot well be made stronger, than one brick's thickness. These considerations led M. SCHELL to think of wooden troughs, and he has successfully executed the idea.

Troughs of this description are used in mines, and are like channels or gutters, formed of three planks fastened together at right angles, which consequently have the shape of long parallelograms. If they be made of such wood, as will resist the action of the water, and if they, besides, be saturated with tar, they not only effectually withstand decay for a great number of years, but also the encroachment of the roots of the plants, which cannot act upon them, either chemically or mechanically; and their renewal may thus for a long course of years be unnecessary. Now if grooves be cut in the side planks, and cross boards inserted at certain distances, for the purpose of dividing the space into compartments of different sizes, and if these cross boards be made of the same kind of wood tarred in a like manner, by this contrivance just so much room may be given to each plant as may be desired, for it is only necessary to take away from, or to add to these partitions, in order to contract or to extend the divisions. The means are also thus afforded of managing every division differently, since, for instance, to plants which do not want much water (as *Salvinia natans*) a deep bed of earth, mixed with small pebbles, may be given, whilst others,

that have creeping roots (as *Hydrocharis morsus-ranæ*, *Menyanthes Nymphoides*, *Menyanthes trifoliata*) may enjoy a greater depth of water.

My account will be more perspicuous if I describe this contrivance for aquatic plants as it has been executed in our botanic garden.

The garden has three large reservoirs of water (Fig. 1. A) in each of which the level of the water is raised one foot above the quarters destined for plants. Of these quarters one was set apart for aquatics. In this division were laid down six parallel compartments of troughs so united together as to present the form of so many Greek Πs, the heads of these letters lying alternately in opposite directions (Fig. 1. C). The troughs are one foot six inches in the clear, and of the same depth (Fig. 2. C), they are made of oak planks three inches thick, and well tarred. They are not laid upon the bare ground, but on strong supporters (Fig. 2. B), which are also tarred, and fastened to stout posts (Fig. 2. A). Stone pillars might also be used for this sub-structure. The space below the cross pieces was kept clear the whole length, so as to prevent the bottom of the trough from touching any thing but its supporters. The troughs themselves received a very slight inclination, not amounting to more than an inch and a half in one hundred feet. This inclination gives to the water a fall which is adapted to all plants; it is sufficient for those that admit of a stronger current, and not too much for such as would be carried away by a quicker stream. It is not easy to confine *Salvinia natans* within one division, it will perhaps stray into the two adjoining ones, for where it grows naturally, and is exposed to a more rapid current

of water, it will sometimes stretch along the whole extent of the rivulet which it inhabits. The species of *Lemna* spread through all the divisions. A slighter fall than that given would create too insignificant a current, and the water, besides being liable to be impeded by the plants, might probably become stagnant.

The experience of several years has proved that the plants not only do exceedingly well throughout the summer, the stronger kinds not excepted (as *Cicuta virosa*, the species of *Nymphea*, *Acorus calamus*, *&c.*) but also endure well the winter; the fall alluded to being sufficient to keep the water from freezing, if the precaution be used to cut away the herbage of the plants below the surface of the water, and to cover the trough with a roof of boards, upon which horse litter must be placed. By cutting down the plants, that which would retard the flow of the water is removed, and by the covering the frost is counteracted.

In the troughs themselves, at various distances, from one, two, and three feet or more, cross boards, or partitions are inserted, which move in grooves, and serve both to check the excessive spreading of the plants, and, on the other hand, when removed, to add at pleasure to the space. These partitions are somewhat lower than the troughs, in order to allow the current of water to pass over them.

The water required for this apparatus, is conducted from the large upper reservoir by means of a leaden pipe of one inch bore, into the first division of the troughs, where it is discharged with a shoot, about the thickness, of a finger, which is sufficient to supply all the troughs, to the extent of five hundred feet, and even all the ground that is interposed.

Between the sides of the troughs, spaces of eight feet and a half in width are left, which are divided length-ways into three parts, that is to say, into two pathways along the troughs, and a middle part, rather concave, and five feet broad. This middle part is filled at the bottom with a thick layer of strong loam, upon which garden mould, or finer soil, is put in sufficient quantity to receive the bog-plants.* The concave shape alone is calculated to retain the moisture underneath, longer than a level space would be qualified to do; but it is also provided that the moisture may be increased at will, by letting out the water from the trough into the cavity, by means of apertures at the ends, where the trough turns (Fig. 1. ε.), and where, for this purpose, a small inclination has been contrived to cause the water to fall. But since these beds are too long to be irrigated sufficiently from one point, an aperture is again made half way in each side of the troughs (Fig. 1. α.) by these means, the beds are watered from two distinct points.

After the water has flowed through all the troughs, the residue is taken off by a drain (Fig. 1. D.) of sufficient depth to keep the surrounding ground from becoming too damp; which is easily accomplished, as it runs into a bottom of coarse sand, which is of immense depth all around Munich.

* We may presume, that the author, instead of making the bed for the bog plants of loam and garden mould, would have recommended peat earth, if that had been within his reach. But that species of soil, we are informed, is not to be met with, in those parts, where he resides. We know that it is the best suited for the cultivation of the plants in question. Under certain circumstances, it may be improved by a mixture of loam. *Secretary.*

As in a botanic garden, the stronger kinds of plants must of necessity be taken up, from time to time, to be cleansed, to have their roots pruned, and to be set in better order, an apparatus of this description facilitates the labour greatly; you not only get at the plants, altogether, more conveniently than when they are in ponds, but you may also treat the plants in any given division, as you like, without interfering, in the least, with the other divisions.

EXPLANATION OF THE FIGURES.

Fig. 1.

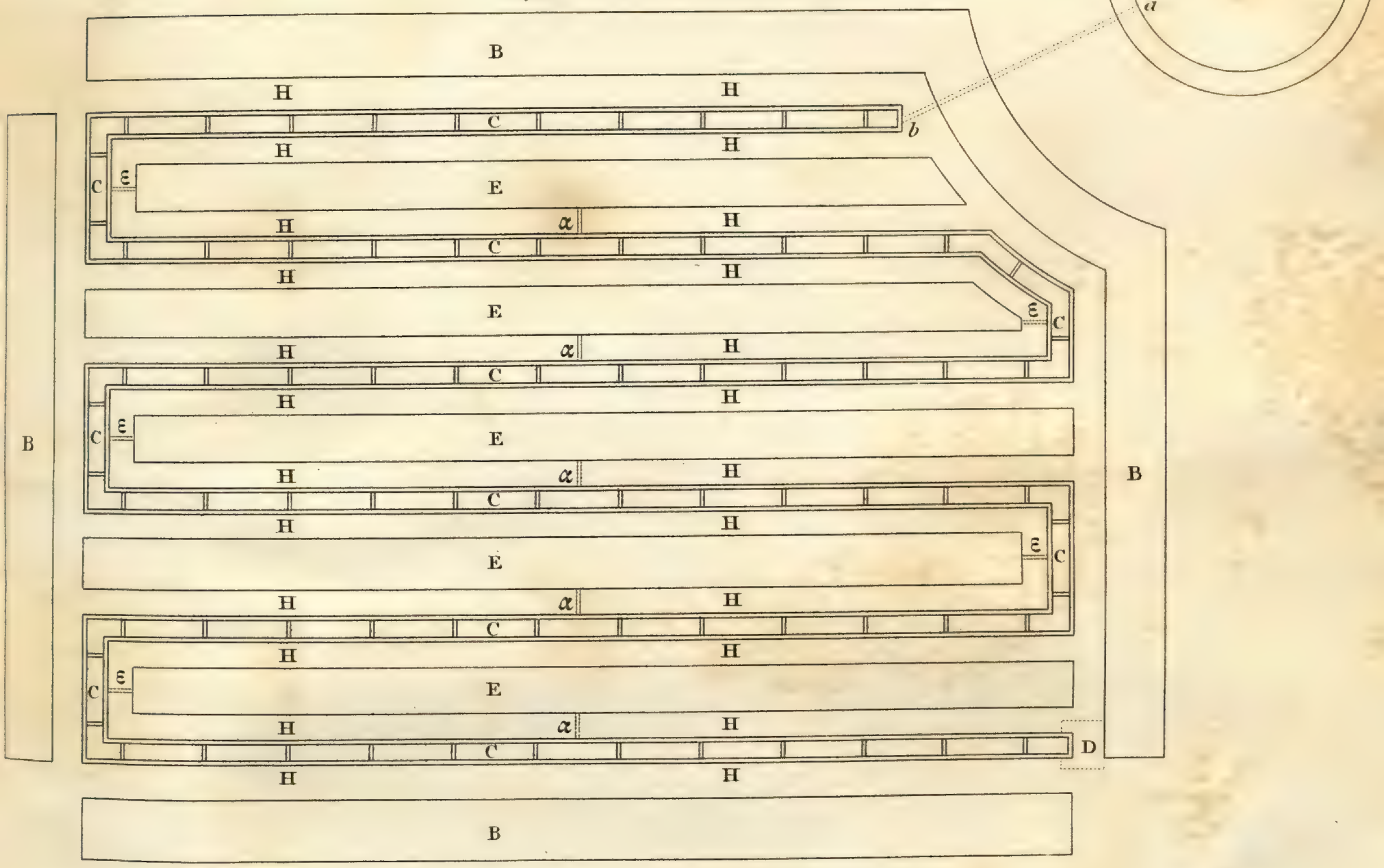
A. One of the large reservoirs, with a low jet, or fountain underneath.
B. The turf borders of the division for aquatic plants.
C. The troughs for the aquatic plants.
D. The sink or drain by which the water flows off.
E. The concave beds for bog-plants.
H. The footpaths about the troughs.
a. b. Course of the water out of the reservoir into the troughs.
ε. α. The outlets from the troughs into the beds for the bog-plants.

Fig. 2.

A. The posts for supporting the troughs.
B. The supporting cross pieces.
C. Section of the trough.
D. Section of the footway.
E. Section of the concave bed.
F. Pipe conveying the water to the bed.

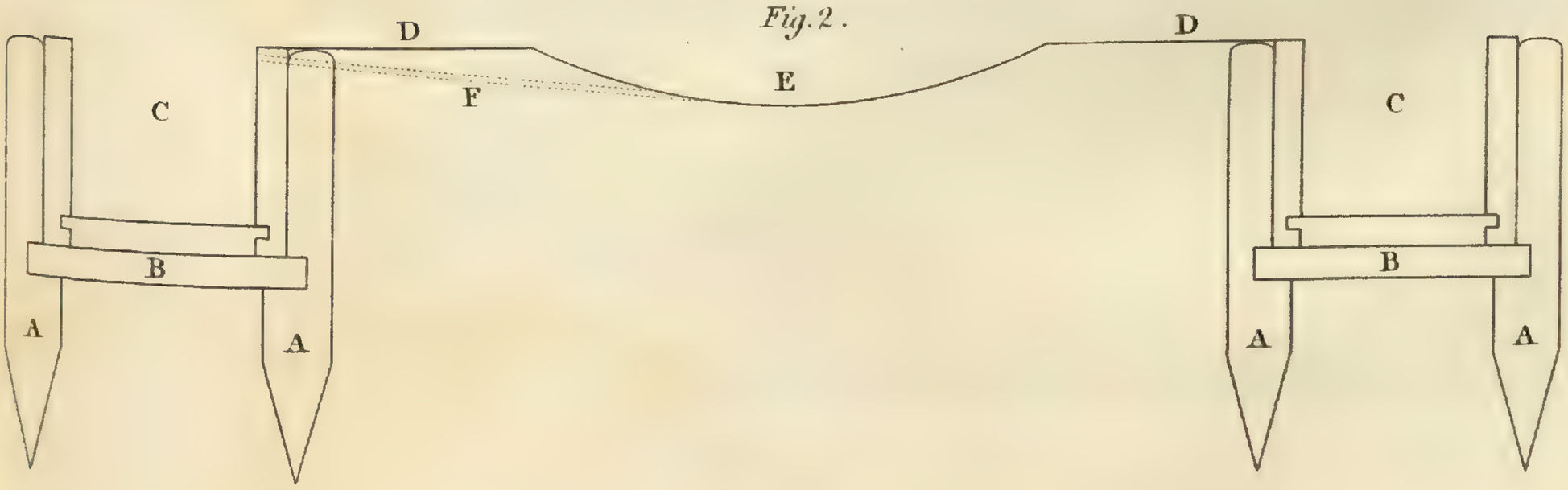
Plan of the Quarter for Aquatic and Bog plants, in the Royal Botanic Garden at Munich.

Fig. 1.



Section of the Troughs, and Border.

Fig. 2.



LIX. *Directions for preserving* Buds of Fruit Trees *in a vegetating State, when sent to considerable distances.* By Thomas Andrew Knight, *Esq., F. R. S., &c., President.*

Read April 3d, 1821.

Some experiments were made two years ago, by Sir Charles Monck and myself, to ascertain the most eligible method of transferring buds from one part of the kingdom to another; the result of which has had the effect of saving me some trouble, and my friends some expense. It has also led me to adopt a better mode of using buds which have become somewhat withered, than I previously knew: and, therefore, as the following account can occupy but a very small space in the Transactions of the Society, I have thought it worth communicating.

Several different methods of packing buds were tried; but the following, which was first adopted by Sir Charles Monck, having proved to be at once the most efficient and most easy of execution, it is useless to describe any other.

The leaf-stalks of the buds were reduced to a very short length, and the young branch was then enclosed in a double fold of cabbage leaf, bound close together at each end, and enclosed in a letter. It was found advantageous to place the lower surface of the cabbage leaf inwards, by which the enclosed branch was supplied with humidity, that being the perspirating surface of the leaf, and the other surface being nearly, or wholly, impervious to moisture.

I did not usually receive the buds from Belsay Castle, the seat of Sir CHARLES MONCK, in Northumberland, in less than five or six days; and the leaf stalk had then often parted from the buds; and the bark could not very readily be detached from the wood. The latter substance was therefore suffered to remain; but it was pared very thin, particularly such part of it as extended above the bud; and as the loss of the leaf-stalk deprived me of the usual method of holding the bud, I found it necessary to suffer that to remain attached to the branch above it, or to a part of it, till I had placed the bud in its proper position; it was then severed from the branch with a sharp knife, and the bud almost always succeeded as well as one recently taken from the tree would have done.

LX. *Observations on a Method of Training* Apple, Cherry, *and* Plum Trees, *in Russia, to preserve them from Frost during the Winter. By Mr.* Joseph Busch, *Corresponding Member of the Society, Gardener to His Imperial Majesty the Emperor of Russia.*

Read April 3d, 1821.

The severity of the winters at St. Petersburg is so great that few fruit trees will survive it, even with careful matting; to prevent the loss which is thus usually sustained, I have for more than twenty years pursued a mode of training which has been attended with complete success. It consists in leading the branches of the trees on horizontal trellises only ten or twelve inches from the ground. When the winter sets in, there are heavy falls of snow, and as the frost increases, the snow generally augments, by which the trees are entirely buried, and receive no injury from the most intense frost. The winters of 1819 and 1820 were very severe, notwithstanding which, last summer, I had a great crop of Apples, and all of the tender sorts, while none of the gardens in the neighbourhood produced any; even many of their trees, although doubly matted, were killed. From my Green Gage and Orleans Plums I gathered ripe fruit on the 29th September last; I had also a very full crop of Morello Cherries.

Another very great advantage of training trees in the above method consists in the growth of the wood, it being of equal strength, and the fruit produced being all alike, the bloom

comes out much earlier, and the crop ripens sooner. The trees are always clean, and free from insects; I have observed this even while some standards near them have had their leaves curled by Aphides.

The only Cherry that does not succeed in this way is our Black-heart; this I attribute to the damps which affect the early blossoms, but in a milder climate this injury would be obviated by placing the trellis higher from the ground. When the trellis decays under the Apples, I never renew it, as the trees always keep (from the strength of their branches) their horizontal position.

There are other advantages of treating fruit-trees in this manner: they come sooner into bearing, and their fruit is not affected by high winds. I never gather the Apples, but let them drop off, for the distance they fall is not sufficient to bruise them.

Probably Pears trained in this way would answer well in England.

LXI. *Notices of Communications to the Horticultural Society, between February* 1st, 1820, *and August* 1st, *of the same Year, of which separate Accounts have not been published in its Transactions. Extracted from the Minute Books and Papers of the Society.*

February 8th, 1820. In a letter received this day from Baron Jacquin of Vienna, addressed to the Secretary, information is communicated of a variety of the *Common Berberry*, (Berberis vulgaris), which may become an agreeable addition to the table fruits. It was discovered wild on a mountain bordering on the Austrian Alps, by the late Mr. Henry Schott, gardener to the Emperor of Austria. Its fruit is perfectly sweet, and of a pleasant flavour. A plant of it is now alive in the garden of an eminent nurseryman at Vienna, but he has not yet succeeded in propagating it.

February 16th, 1820. Dr. Fischer of Gorinki, near Moscow, in a letter to the Secretary, mentions that *Begonia Evansiana** is now abundantly cultivated in the stoves of Moscow and St. Petersburg on account of its leaves, which are used as an acid esculent; when dressed they are more palatable and tender than those of Sorrel, and though the Begonia will require a more expensive treatment in summer than that herb, yet in the winter season it may, under many circumstances, be advantageously substituted for it. The Begonia Evansiana is a native of China and Japan.

* See Botanical Magazine, 1473.

February 22, 1820. Mr. Robert Gunter, in a Communication read this day, states the effects which he had found result from the application of *Steam* (the actual vapour) as a bottom heat for Pine plants, in a stove in his garden at Earl's Court, near Brompton. The steam was conveyed into a chamber in the bottom of the pit, over which were laid cross bars covered with brush-wood, and upon that was placed the mould in which the Pines were planted. The quantity of heat imparted to the earth was very great, but, contrary to his expectation, no vapour ascended into the mould, which became excessively dry and husky, nor was he able, by frequent waterings, to keep it in a state fit for vegetation; the roots of the plants in it, in spite of every precaution, becoming shrivelled and dry.

The want of success in the experiment probably arose from the circumstance of the vapour becoming condensed in the chamber, so as that no part of the moisture penetrated the earth, and the heat which did enter the mass of mould must have been excessive, and would necessarily become destructive to vegetation. In Count Zubow's steam-house at St. Petersburg,* where steam was introduced into a chamber similar to that of Mr. Gunter's stove, but which was partly filled with water, which imbibed the heat of the steam, a wholesome temperature was obtained, and communicated to the mould above the chamber, in which Pines grew luxuriantly, though turned out of pots into the earth.

March 13, 1820. M. Vilmorin of Paris, in a letter to the Secretary, communicates some particulars relative to

* See Horticultural Transactions, vol. iii. page 430.

the varieties of the *Almond*, the nuts of which he had sent to the Society, and which were exhibited to the Meeting on the 21st. The *Amande commune* is about an inch and quarter long, with a hard smooth shell, containing a small kernel of little value, in comparison with others ; this is the commonest kind, and the young plants are frequently grown for stocks for Peaches. The *Amande douce à coque dure* is the preferable variety for stocks, and is the kind used by careful gardeners ; the nuts of these are large, fully an inch and a half long, smooth, and of a dull colour ; the shell is thick and hard, the kernel is small, and not high flavoured ; this is an improvement of the Amande commune, and differs from it only in having larger fruit. The *Amande douce à coque tendre* much resembles the last in appearance and colour, but it has a tender shell ; one side is usually straight, and the other rounded : this sort is budded on the others, and is grown in gardens, to produce the young Almonds which in France are eaten fresh in July, the kernel being sweet and well flavoured. The *Amande des Dames* is eaten dry, and cultivated as an article of commerce in the southern parts of France : this nut exceeds an inch in length, is of an oval shape, and thicker in proportion than the others, the shell being light-coloured, porous, and tender, the kernel plump, rich, and sweet. The *Amande Sultana* resembles the Amande des Dames, but is smaller ; and the *Amande Pistache* is similar, but of still less magnitude ; the two last varieties are peculiar to the south of France, and are not in general cultivation. The *Amande Princesse* approaches to the Amande des Dames in its qualities and size, but it has a much thinner shell, which is rough externally, appearing as if the outer part were removed. Of

the *Amande amère*, or bitter Almond, there are varieties differing in the size of the nuts, which are dark coloured, with hard shells and bitter kernels.

In a communication of the same date, M. VILMORIN, in making some observations on the account of the varieties of Onion, published in the Transactions of the Society,* describes the *Ognon Pyriforme*† and the *Ognon Blanc de Florence* of the *Bon Jardinier*. The former is the Tripoli Onion of our gardens. The latter is a smaller and early variety of the Silver-skinned Onion; the seed of this is regularly obtained from Italy, without which renewal it would in France degenerate into the Ognon Blanc hatif, which latter would also become the Ognon Blanc ordinaire, or Silver-skinned Onion of our gardens, if care were not bestowed on its culture.

APRIL 4, 1820. JOHN BRADDICK, Esq. in a letter to the Secretary, under this date, states that he had adopted *a method of grafting* scions of Apples, Pears, Plums, and Cherries, with the quality of which he wished to be soon acquainted, which generally enabled him to get some produce from the grafts in the year succeeding that in which they are worked. He works his graft on a fruit-bearing branch of an established tree, cutting it down to within half an inch of a fruit spur, and placing his scion on the end of the branch so cut away; the graft thus being fixed close to, and above the fruit-spur of the tree, in the same season acquires the habit of a fruit-spur, and forms flower buds which blossom and bear fruit in the following year. In like manner the buds of Peach and Nectarine trees, of one year

* See vol. iii. page 369. † Ibid, page 376.

old, inserted into branches of productive trees, will form fruit-bearing branches in the succeeding year, and thus the quality of the produce of such seedlings can be ascertained in the third year from their first production from seed.

April 8, 1820. In notices received of *Grafted Apple-trees* from the French gardeners, some are described as being worked "*sur Doucin.*" M. Noisette, in a letter to the Secretary, received at the above date, explains the peculiarities of this stock in the following manner. "In reply to your enquiries relative to the stock which the French nurserymen call *Doucin*, I have to inform you that it is intermediate between the *Pommier Paradis* (Paradise stock), and the *Pommier franc* (Free stock), being larger than the former, and less than the latter. We work our choice varieties of Apples on the *Paradis*, to obtain trees of small size for borders or for walls. We use the *Doucin* for various dessert Apples, where we can allow the trees to occupy a greater space, or to be trained in the different forms, *en pyramide*, *quenouille*, *éventail*, or *gobelet*, according to the fancy of the gardener; and the *pommier franc* attaining the greatest elevation, we graft on it the kitchen or cyder fruits."

April 17th, 1820. Mr. John Mearns, Gardener to William Hanbury, Esq. at Shobden Court, near Leominster, in a letter to the Secretary, details his practice of obtaining *Cucumber Plants for the winter crop*, in the stove, from cuttings in the autumn. He finds that the plants raised from cuttings are less succulent, and therefore do not so readily damp off, or suffer from the low temperature to which

they are liable to be exposed in severe weather, that they come into bearing immediately as they have formed roots of sufficient strength to support their fruit, and do not run so much to barren vine, as seedlings are apt to do. His mode of propagation is to put about four inches and a half of mould into pots nine inches deep, in which he plants the cuttings taken from the tops of the bearing branches of the old Cucumber plants. He then waters them, covering the tops of the pots with flat pieces of glass, and plunges them into a gentle bottom heat. The sides of the pot act as a sufficient shade for the cuttings during the time they are striking, and the flat glass in this and in similar operations, answers all the purposes of bell-glasses. The cuttings form roots, and are ready to pot off in less than a fortnight. This practice is not altogether new, but not being generally known is deserving of publication.

At the same time a communication on the use of *Water impregnated with Pigeon's Dung*, as liquid manure, was received from Mr. Mearns, and read at the Meeting on the 18th of April. He had experienced the advantages of this liquid with his Pine-plants, which he had used at the suggestion of Mr. Knight, and having some Cucumber plants in the Pine-stove, which had been planted in January, but which, in consequence of dull weather, had become weak and of a pale green colour, he applied the liquid to the roots, and in a few days a great change in the appearance of the plants was produced: the foliage assumed a hardy green, the shoots acquired an unusual degree of strength, with short joints, and although the stove had scarcely any air given to it, yet the fruit swelled off rapidly, and attained

a large size. One of the plants, the laterals only of which had been stopped, measured ten feet in length, and an inch and three quarters in circumference, within two joints of the top. The leaves, at their full growth, were between eleven and twelve inches wide, nearly of the same length, and very fleshy. The liquid is prepared by infusing the dung twenty-four hours or more, in the water, in casks, and it is drawn off for use in as clear a state as possible. In a letter to the Secretary, dated the 14th of July following, Mr. MEARNS reported that the Cucumber plants had continued to bear till May, when he cut them back to the lowermost shoot, about six inches from the root; they started again with vigour, and were then in full bearing, no water having been given to their leaves, but a continual supply of the liquid pigeon dung manure to their roots.

APRIL 18th, 1820. Mr. RICHARD WILLIAMS sent *Flowers of the Waterloo Hyacinth.* This has peculiar properties, which distinguish it from other varieties of Hyacinths, and make it deserving of separate notice. It has a semi-double flower, of a bright rose colour, growing in compact trusses, which are frequently fasciated, thereby becoming very thick and full; and as each root throws up many stems of flowers, besides the principal one, a great display of blossom appears on each bulb at once, forming a very handsome mass of flowers together. Those now exhibited were from the open ground in Mr. WILLIAMS's garden, at Turnham Green, where they have been cultivated two years, and may therefore be considered as tolerably hardy. They increase rapidly by offsets. This Hyacinth, it is supposed, before it

received its present appellation, was known to florists as the *Bouquet tendre.*

April 18th, 1820. The Rev. William Williamson, in a communication read this day, describes an economical method of preserving, during the winter, *Geraniums*, which have been planted in the open borders. He observes that it has of late years been a very prevalent practice to adorn courts and shrubberies, during the summer months, with Geraniums planted in the natural ground, many of which are not of sufficient value, and are of too luxuriant growth, to be placed in the conservatory during the winter; he therefore recommends the following means of preserving them :—in the autumn, before there is a possibility of frost, and before the ground is saturated with rain, he takes up the plants, strips off their leaves, prunes both their branches and fibres, leaving only the woody part of the stem and the larger roots. The object in cutting off the top and leaves is to prevent the plant from rotting by the sap which abounds in the more tender shoots, and it is more likely to be kept in a state of rest by taking away the fibrous part of the root; afterwards they are laid in a dry shady place to heal. He then covers the bottom of a box with dry sand, and on this places a layer of Geraniums rather close together, covering them with sand, and so on alternately layers of Geraniums and sand, till the box is filled. It is then removed into a cellar, or any place where the contents are not likely to be affected by frost. When re-planted in the month of May, if they have not been kept in too damp a place, the plants will shoot vigorously, and make a more shewy appearance than newly raised plants.

May 16th, 1820. Mr. James Hay of Arno's Vale, near Bristol, in a communication read this day, details the method practised by him of obtaining *a Crop of Grapes in the Pine-stove* earlier than usual. About the end of December he prunes the Vines which he has in the Pine-stove, and at that time he selects as many shoots as he intends to lay down in pots for his purpose. He pegs these down in pots eighteen inches deep, and eighteen inches in diameter, leaving the shoots according to their strength, from twelve to twenty feet long. In three weeks after the shoot is laid down it begins to root, and as the sap flows the pot is soon filled with roots. The great additional support which the shoot derives from these new roots not only greatly increases the size of the berries, but hastens their ripening. When the bunches are fit to gather, the shoot may be cut off from the main plant, and the pot carried to table. The produce on each shoot thus treated is considerable.

May 30th, 1820. Mr. Hay, in a letter to the Secretary, in reply to an enquiry as to his *Method of forcing Gooseberries and Currants*, represents that he has uniformly succeeded in ripening them in Peach-houses, in pots: in the beginning of November he selects healthy year-old plants, and pots them in the size called twelves; these are then plunged to the rim in a border, and covered with any loose material, to protect the roots from frost. Towards the end of January they are removed into the Peach-house, and by the end of April the fruit is ripe, and may be sent to table, growing on the plants. A succession crop is secured by taking another set of pots into the Peach-house in the middle of February.

June 6th, 1820. The Duke of Atholl having sent to the Society *Specimens of five kinds of Larch*, grown on his estates, in Scotland, accompanied by observations on them, this communication, together with some notes thereon by Mr. Lindley, was read at the Meeting; the kinds were:

1st. *The Common Larch, Pinus Larix*, with red or pink flowers. In the Duke of Atholl's plantations on mountainous tracts, at an elevation above the sea of fifteen or sixteen hundred feet, this tree, at eighty years of age, has arrived at a size to produce six loads of timber, appearing in durability and every other good quality, to be likely to answer every purpose, both by sea and land.

2nd. *Pinus Larix*, from the Tyrol, with white flowers. This kind seems not to have been before noticed. It is very remarkable in its appearance, from the whitenes of its cones, which, in the specimens sent, were erect and not cernuous. The shoots are much stronger than those of Pinus Larix, with red cones. The foliage of the two are similar.

3rd. *The Weeping Larch*, from the Tyrol, a variety of Pinus Larix. It is different from the Pinus pendula, or Black Larch, of North America. The tree grows to a large size.

4th. *Pinus Microcarpa*, the Red Larch of North America. There are some trees of this kind fifty years old upon the Atholl estates, but they do not contain one-third as many cubic feet of timber as Pinus Larix at a similar age. The wood is so ponderous that it will scarcely swim on water. Its cones are much shorter than those of the Pinus Larix, its branches weaker, and its leaves narrower.

5th. *The Russian Larch*, raised from seed procured from Archangel fourteen years ago The appearance of the tree

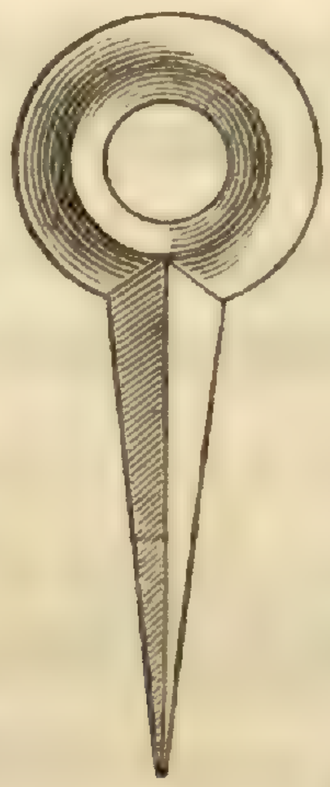
is coarser than that of Pinus Larix; the tree is of much slower growth than those of Pinus Larix from the Tyrol, its general aspect is very unlike that of the other species, the bark is quite cenereous, not of a yellowish brown colour, and not distinctly scarred, as in the common Larch, but, on the contrary, the vestiges of the scars are scarcely visible; the leaves come out so soon that they are liable to be injured by spring frosts: and what is remarkable, the female flowers are not produced till some time after those of the European Larch appear: they are like those of Pinus microcarpa. Mr. SABINE has a plant of this sort in his garden at North Mimms, which he received under the name of *Larix Sabirica*, from Messrs. LODDIGES, who obtained the seed originally from Professor PALLAS, whose Pinus Larix it probably is; he contrasts the cenereous bark of his plant with the pale brown colour of the common Larch; it may prove to be a distinct species.

With the exception of Pinus pendula, these are all the kinds of Larch at present known.

JUNE 20th, 1820. The Hon. ROBERT FULK GREVILLE sent from his conservatory at Castle Hall, near Milford, in Pembrokeshire, a fine specimen of the *Madras Citron*, which seems a very desirable variety to cultivate for ornamental purposes. It possessed much of the character of the Shaddock, being of a regular form, and with a smooth skin, much thinner than that of the Citron usually is. It was nearly sixteen inches in circumference, each way, very compact and heavy. The juice was extremely acid, and the flesh, which was coarse, slightly tinged with red, like the Shaddock.

The tree from which this fruit was gathered is nineteen feet high, and as much in diameter across the branches. The stem, from the ground to the commencement of the branches, is five feet and a half high, and the circumference eleven inches. At the time the present specimen was gathered, there were three hundred and twenty fruit of different sizes, besides abundance of blossom on the tree.

JULY 18th, 1820. Specimens of *Nails for Fruit Walls* were exhibited, manufactured by Messrs. YATES and Cox, of Liverpool. They are made of cast iron, with round eyes, in the following shape ;



and are intended to be permanently fixed in the wall when building, between the courses of brick-work ; by leading the branches of the trees close to them, and tying them by pieces of matting or string run through the eye, they can be trained in any direction, without damaging the wall, as is done by the usual practice of nailing, which, in process of time, creates innumerable holes, which become the hiding places of various sorts of insects.

LXII. *Notice relative to the Management of the* Crinum Amabile; *with some Account of, and Observations on, the Plant so named. By Mr.* James Verrell, *Gardener to the Right Hon. Sir* Charles Long, *G. C. B. F. H. S. at Bromley Hill, in Kent.*

Read March 6th, 1821.

The *Crinum amabile*, from which the flower exhibited to the Society on the 6th of February last was gathered, was sent to Bromley Hill from Wormleybury, in 1815; it was at that time very young, and was but a small plant in 1817, when I sunk the pot in which it grew about two-thirds of its depth into a bed of sand in the stove. Underneath the pit, which is thus filled with sand, to the depth of twelve inches, is a chamber, extending the whole length of the pit, the air in the chamber being heated by a fire flue passing round it, by which means the sand is kept constantly warm. The pot in which the plant grows is sixteen inches in diameter at the top, but the bottom is of smaller dimensions, and the depth is about equal to its upper diameter. Soon after the pot was plunged in the sand, the roots of the bulb found their way into the sand through the holes, as well as through a crack in the bottom of the pot, and have gradually extended themselves a considerable distance in it; and to this circumstance, I attribute its luxuriant growth. The pit is frequently watered, and it seems as if the moistened sand was peculiarly congenial to this bulb. In October 1818, it produced

its first blossoms ; in 1819 it flowered three times, and in 1820 four times, and the flower which was lately sent to the Society is the first of the present year. The soil within the pot is a rich loam, mixed with a small portion of vegetable mould and rotten dung. The house is generally kept in a brisk heat, and abundance of water is given to the plant, especially when it puts forth its blossom.

The bulb in the thickest part, next the soil, is two feet three inches in circumference, a considerable part of it grows above the surface of the earth, having a long extended stem or neck which terminates at the top in a crown of leaves spreading elegantly in every direction, with the ends bending downwards ; the leaves are from four to five feet long, and from five to six inches wide in the broadest part ; their edges are smooth, and when held up to the light, appear very regularly striated longitudinally. The flowering stem, or scape, breaks out from the neck of the bulb, below the leaves : it is compressed, not round, about three inches in circumference, grows generally three feet or more in length, and is slightly tinged with colour. The umbel of flowers is at first enveloped in a slightly tinged, green spathe, about eight inches long, which divides into two parts, and becomes reflexed close to the scape, shewing its inner surface, which is very pale and shining. The flowers usually average above thirty ; they rise irregularly from the flattened top of the scape, intermixed with narrow bracteæ, which are from three to four inches long, their inside being nearly white, and their backs keeled, and stained with lake. Each separate flower has a peduncle about an inch and a half long, more or less speckled with the same colour as the rest of the flower, but

duller, sometimes it is nearly all green; the germens are slightly swollen; the tubes from four to five inches long, nearly cylindrical, and of a dull shining lake; the backs of the laciniæ, before they expand, exhibit the same colour as the tube, but more brilliant; the laciniæ, when expanded, are upwards of six inches long, lanceolate, and shew their inner surface white, with a broad stripe of lake down the centre; the filaments are purple, half the length of the laciniæ; the anthers, when open, are yellow; the stigma is purple, and a little longer than the filaments. The whole bunch of flowers grows compactly together; but frequently extends two feet; I have counted fourteen blossoms open at the same time, each of them a foot in expansion; they are individually of short duration, the outside ones open first, and at that time those that are nearest the centre are in the state of buds of different sizes, but all smaller and shorter than the outer ones.

No description can convey a adequate idea of the splendour of this magnificent plant, which possesses the additional charm of an agreeable fragrance in its blossoms. The colour has been variously described as rose, rosy-purple, and carmine; but I think it is nearest to a lake. I have frequently impregnated the stigma with the pollen of its own anthers; but the germen constantly falls a short time after the flowers are withered. It propagates itself very slowly by offsets; the plant I have described produced one in 1819, and is now giving another, which comes up close from the base of the bulb.

The parent of Lady Long's plant is now in the garden of Sir Abraham Hume at Wormleybury, in Hertfordshire;

it was sent to Lady AMELIA HUME, from Calcutta, in 1808, by Dr. ROXBURGH: it blossomed first in July 1813, and was then figured in the *Botanical Magazine*.* This plant has produced only four off-sets; one, that which is here described; the second was given to the Dowager Lady DE CLIFFORD; the third was given to Mr. GRIFFIN of South Lambeth; and the fourth is still at Wormleybury. In the figure of the *Botanical Magazine*, the antheræ are erroneously coloured purple, and the peduncles are not usually so green as there represented.

The name of *Amabile* has been attached to this species in England, though it is not now known by that appellation among the botanists of the East Indies; but it was so called when it was sent to Wormleybury by Dr. ROXBURGH, in 1808. This name was first published in the sixth edition of DONN's *Hortus Cantabrigiensis* in 1811, and was adopted by Mr. BELLENDEN KER, who drew up the description of the plant for the *Botanical Magazine* in 1813; he afterwards, in his Monograph of the Genus Crinum, published in 1817, in the *Journal of Science and the Arts*,† identified it with the Crinum superbum of Dr. ROXBURGH's MS. *Flora Indica*. The Hon. and Rev. WILLIAM HERBERT, in his treatise on the Amaryllis longifolia, read to the Horticultural Society in 1818,‡ mentioned that Crinum amabile had been ascertained to be the C. augustum of the Calcutta Catalogue, he having received from Dr. CAREY of Serampore a plant with the name of C. augustum, which on flowering

* See Botanical Magazine, plate 1605.

† See Journal of Science and the Arts, vol. iii. page 11.

‡ See Horticultural Transactions, vol. iii. page 195.

proved to be C. amabile, and in bulb and foliage was not distinguishable from the plants which were sent to him from Calcutta as C. superbum. These circumstances, joined to an assurance from Dr. Carey to Mr. Herbert that C. augustum was the C. amabile of the *Botanical Magazine*, subsequently led Mr. Herbert to the supposition which he published in the *Botanical Magazine** in 1820, that all three were probably one and the same species. The point still requires elucidation. Dr. Carey has since assured Mr. Herbert that the C. augustum and superbum of Roxburgh are different. The bulb received by Mr. Herbert under the name of C. augustum, which on flowering proved to be amabile, as well as others sent to England by Dr. Carey, in the following year, appear to have been erroneously designated, probably in consequence of some confusion of labels in his garden at Calcutta. Mr. Herbert has since received from Dr. Carey, under the name of C. augustum, a large bulb, which is distinguishable from C. amabile, or superbum, by obtuse instead of acute points to the leaves. It produced a scape with twenty flower-buds last winter, which were prevented by accident from expanding.

Dr. Roxburgh's description of the Crinum superbum is very minute, and agrees well with the Crinum amabile; he says that it is a native of the interior of Sumatra, from whence it was sent by the late Dr. Charles Campbell to the Botanic Garden at Calcutta, where it thrives luxuriantly, and blossoms at various periods of the year; and that the beauty and fragrance of its flowers make it the most desirable of the Liliaceous tribe. He states also that its seed vessels are

* See Botanical Magazine, 2121. page 4.

abortive in Bengal. The drawing of this plant, N. 2131, in the Roxburgh Collection of the East India House, shows a single flower of the natural size, and the whole plant in miniature; the flower in this drawing exactly corresponds with that of C. amabile, but the representation of the plant has differences which, if not errors of the artist (which it is more than probable they are), would be decisive against the identity of the two. In the drawing the root has little appearance of being a bulb; it is all above ground, has a thick stem, said to be the size of a man's leg, and from the sides of the stem (and not from its base) small shoots or suckers spring forth in abundance.

The Crinum augustum is very briefly described by Dr. Roxburgh as follows: "Bulb, columnar, above ground; leaves sparse, lanceolate, channelled, smooth-margined; scapes lateral, length of the leaves; umbels of twenty-thirty pedicelled declinate flowers, sweetly fragrant and rosy; tube a lighter purple; filaments and style purple." Some parts of the description do not perfectly agree with our C. amabile. The C. augustum was introduced from the Mauritius to the Botanic Garden at Calcutta; it blossoms there at various times through the year, but with the greatest luxuriance during the rains.

Messrs. Loddiges are in possession of a plant which has been usually taken for the Crinum amabile, but which possibly may turn out to be Crinum augustum: at all events it is different from the Wormleybury bulb. It was brought to them eight or nine years ago, from the East Indies, by the late Dr. Heyne; it flowered soon after its arrival, and has flowered regularly ever since, generally twice, sometimes

thrice, in the season. It is a much more gigantic plant than the real Crinum amabile, and has not shewn the least sign of producing offsets.

Sir Stamford Raffles, in a recent communication from Sumatra, to Lord Carnarvon, has thrown some light on the subject of the Crinum superbum of Dr. Roxburgh. He has sent a fine drawing by a Chinese artist, of an entire umbel of flowers which proves beyond dispute, that it is the same as the Crinum amabile. In his letter, which is dated April 15, 1820, he describes the scape as larger than a man's wrist, and mentions that the bulb blossoms all the year round, being seldom without one or two umbels of flowers, which diverge and expand in every direction, each head being not less than two feet in diameter, the plant attaining the height of five feet. Such is the appearance of this magnificent Crinum in the gardens at Sumatra, and from the well known zeal of Sir Stamford Raffles, an abundant supply of this and other scarce plants will doubtless reach this country.

LXIII. *Upon* Pruning *and* Training *the* Plum Tree. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read April 17th, 1821.

In pruning and training the Peach and Nectarine tree, the advantages, and indeed the necessity, of bringing the blossom buds into close contact with the wall, are well known to every gardener. The hardier blossom, and somewhat different habits of the *Plum and Cherry* tree, have led to a different mode of treatment, numerous short branches being allowed to extend a few inches from the wall. In favourable situations, and in all such as are not much subject to injury from the frost in the spring, the latter mode of pruning and training is found to succeed sufficiently well; but in less favoured situations (among which I have unfortunately to reckon my own garden) the short projecting branches are generally found to afford an exuberance of blossom, with a very irregular, and often scanty production of fruit.

Having some years ago lost my crop of Plums almost wholly, during three successive seasons, I resolved to destroy altogether the projecting spurs, and to adopt the mode of pruning and training which I proceed to describe and to recommend.

Upon the first destruction of the projecting spurs, which was, however, done somewhat gradually, the quantity of blossom was a good deal diminished; but by shortening

successively parts of the old branches, and destroying in summer every shoot which did not grow, or apparently could not be brought in winter, into contact with the wall, I have now in every season as abundant blossom as I had upon the projecting spurs, and much more fruit than my trees can properly support: and during the progress of the experiment, I had not a single failure of fruit. Almost the whole of it now grows in actual contact with the wall, and the effect of this has occasioned very considerable changes in the form, size, and quality of it. Coe's Golden Drop and the Imperatrice Plum are, in every respect, greatly improved. The Green Gage has been much enlarged, and rendered much more juicy: and, in its highest state of maturity, it is, I think, a better fruit than I ever previously possessed it in my garden; it also differs more widely than usual from the character it assumes when produced by a standard tree in a more favourable climate: such standard trees are generally thought to afford this fruit in its highest state of perfection in richness and flavour. Many gardeners in this vicinity have lately adopted the same mode of management, and, in all cases, with the same results.

LXIV. *On the Management of the* Fig Tree *in the open Air. In a Letter to the Secretary. By the Rev.* George Swayne, *A. M.*

Read September 19th, 1820.

Sir,

Among the many interesting Papers contained in the Society's Transactions, I find no fewer than five* (including the selection† in the Appendix to the first volume), on the improved management of the *Fig tree*. From the general contents of these Papers, but particularly from that of the Right Hon. William Wickham, I infer that the principal defect requiring a remedy, is a deficiency of fruitlings (or bloom, as it may, with no great impropriety, be termed, since we see no other), in the early spring, on the whole of the last year's shoots, excepting on the few joints at their extremities; on which shoots it is well known that the Fig tree in this county, in the open air, and unassisted with artificial heat, produces all its mature fruit of the succeeding season; and from hence I am led to conclude that the remedy which I have for a long time been in the habit of using, and which I consider as a specific, is not in general application.

I have in the London Quarterly *Journal of Science and the Arts*‡ briefly stated the plan I pursue, which I will now

* See vol. i. page 252. Vol. ii. page 228. Vol. iii. page 307, and page 461.

† See vol. i. Appendix, page 6.

‡ Vol. vii. page 169.

detail more particularly; it is to rub or break off with the finger and thumb, all the Figs which are produced after midsummer, on the same year's shoots, not one of which will ever ripen in this country without the aid of artificial heat. It is important that this business be performed *without delay*. As soon as these small Figs can be discovered by the naked eye, they must be displaced; not only to prevent them from exhausting the vigour and natural powers of the tree by their further growth, but more especially to give it sufficient time to exert those powers, in the seasonable preparation of new embryo Figs, for the following year, in the room of those immature fruit, of which it has thus been deprived. If this operation be performed in due time, it will not fail to prepare on one, and often on both, sides of almost every Fig so displaced, such embryos. For this purpose the trees should be examined once a week, at least, from the beginning of August, at which time the Figs of this second crop usually begin to shew themselves, and this examination must be repeated as long as any of these make their appearance.

Most gardeners, indeed, except those who are very negligent, rid their trees of this sterilizing incumbrance at one time or other; but then they do not think of doing it (nor are they directed to do it in any gardening book that I have seen), till the leaves drop in the latter end of October, or beginning of November, by which time these blood-suckers will have done all the mischief in their power.

Mr. James Smith, in his communication to the Caledonian Horticultural Society,* on the cultivation of Figs in

* See Memoirs of the Caledonian Horticultural Society, vol. ii. page 69.

Scotland, in treating on this secondary crop of Figs, expresses himself as follows: "at the end of October, or beginning of November, the young shoots should be cleared of all untimely half-ripened fruit; but all young fruit of the size of small beans or peas must not be touched, for *if* they survive the severity of the winter, they will be the first ripened fruit next season." Mr. SMITH did well to state the case *hypothetically*, for I will venture to say that not a single Fig, that can be seen to be a Fig, fairly protruded from the bud in the autumn, will ever become a perfect and mature fruit in the following season. Not one of this description therefore should be left.

Although I differ from Mr. SMITH in this particular, as likewise with respect to the most proper time of pruning the Fig tree, yet I account his management on the whole very judicious, and particularly approve of his winter covering of branches of Spruce Fir, where any thing of this sort is found to be requisite. But I do not conceive covering to be absolutely necessary. Mats, small branches of ever-greens, dried Fern, &c. stuck in behind the branches, generally do more harm than good; since they are likely to be dislodged by the winds and storms of the winter, and then will leave the young shoots unprotected in the sharp months of March and April, after they have been nursed by them through perhaps the mildest part of the winter, and thus rendered more tender than they would otherwise have been. Mr. SMITH's method obviates this objection, but large Spruce Fir branches it is not in every one's power easily to obtain.

I train my Fig trees horizontally, and delay pruning them till late in the spring, when I can plainly distinguish between

a leaf and a fruit-bud, as well as appreciate the whole of the mischief occasioned by the frosts of the preceding winter.

The best exemplification of the effect of the very simple and easy manipulation above described, will be found in the few branches of my Fig trees with the leaves and fruit in various states of maturity, which I send herewith.

You will observe that some of the specimens contain the whole of the last and present years shoots; and that on the old wood there are Figs either ripe, or which would have ripened, if they had been left on the trees, at almost every eye or joint, except a few at their upper parts; and I think you cannot fail to perceive on the young wood the embryo Figs, in preparation for the next year's crop, which I have mentioned above.

Could Mr. WICKHAM, to whose Paper on this subject I have before referred, have an opportunity of examining these specimens in a recent state, I cannot but believe that he would be inclined to discard the opinion which he has expressed in the second page of his Paper, namely; that a first crop of Figs, i. e. a crop capable of ripening in England, could have been produced on that part *alone* of the year's shoots which had grown after midsummer;* an opinion, however, in which he is not singular, for it has hitherto been taught by all writers on gardening, whose works I have looked into, that Fig trees only produce their fruit at the extremities of the last year's shoots. The author of the Dictionary entitled *Mawe and Abercrombie's*, says, under the article *Ficus carica*; "the fruit is always principally produced towards the extremities of the shoots," and again, as

* See Horticultural Transactions, vol. iii. page 75.

I before observed, " these trees always producing their fruit upon the upper parts of the young wood." The Rev. Mr. LAWRENCE, in his *Clergyman's Recreation*,* limits the fruit to the three last eyes.

The line or circle of separation between the spring and midsummer, or rather post-midsummer, parts of the year's shoots, is less remarkable in the Fig tree than in many other trees. Mr. WICKHAM has described the midsummer shoot to be commonly in the proportion of one to six or eight in length, when compared with the shoots of the spring. I am disposed to assign to the post-midsummer shoots in general only the three or four last eyes. Now it is obvious that in the specimens sent you, not one Fig appears on the post-midsummer shoots of the last year; and the reason of this I presume to be, that the wood of those shoots on which two of the embryo Figs had been prepared, i. e. those at the very extremities, was not sufficiently ripened, and that those embryos immediately beneath were in too forward a state; and therefore all those which I assign to the post-midsummer shoots were destroyed by the winter's frosts. The present appearance of these specimens suggests this to have been the cause of the failure. The fact of failure, however, is evident.

I have said above that I do not conceive covering Fig trees in the winter to be absolutely necessary, because I can obtain Figs without this precaution; and I have sent a branch as a proof of this: on it you will find two Figs (one of them nearly ripe), on the lower part of a last year's shoot, a considerable part of which, to the amount of at least twelve

* See 5th Edition, page 52.

inches in length, has been evidently destroyed by the frost.

I have also sent a specimen, from a neighbour's garden, of a branch of a Fig tree which has not been treated in the way I recommended; on this there is the appearance of minute gemmæ at the base of those immature Figs, which have not been broken off, as well as those which have. Whether these are leaf or fruit buds is uncertain. But even if they are the latter, we know that with the usual management they always prove abortive.

I have two Fig trees, each planted in a corner facing the south, the corners being formed by walls meeting at right angles; of course one part of each tree has a south-east and the other a south-west aspect; and I have generally observed that the first Figs ripen on the south-west. These two trees cover less than forty square yards of walling, and the crop on them, including those already gathered, will amount to, as near as I can count them, about twenty dozen of Figs. This, considering the severity of the last winter, and that one of the trees is in an advanced state of decay, will probably be considered as a pretty fair crop.

I remain,

Your very humble servant.

GEORGE SWAYNE.

Dyrham, near Bath,
September 15*th*, 1820.

LXV. *An Account of a* Steam Apparatus. *In a Letter to the Secretary.* *By Mr.* Joseph Hayward.

Read October 17th, 1820.

Sir,

I beg leave to recommend to your attention a *Steam Apparatus* for heating houses, the invention of Mr. Hague, Engineer, of Grey Eagle Street, Spital Fields, and for which he has obtained his Majesty's letters patent. By the mode in which the condensed steam is returned into the boiler, without exposure to the atmosphere, this apparatus produces a higher degree of heat, with less danger, less labour, and less expense in the supply and consumption of water and fuel, than can be obtained by any other method at present known.

Mr. Hague erected an apparatus, on this principle, in a large manufactory under my immediate superintendance; the boiler of which contains about seven hundred gallons; the pipes are cast iron, six inches in diameter, and form a range of three hundred feet; in this apparatus the steam is kept up to a pressure of six or seven pounds to an inch, with the consumption of six bushels of coals in twenty-four hours.

Being satisfied of the value of this arrangement, I have erected a similar apparatus in a small conservatory, of which I send a sketch, the boiler of which contains about thirty

gallons, and the pipes are three inches in diameter; and I calculate on the following advantages:—first, the pipes are so laid as to have thick planks, resting on pegs, placed over them, to form the passage, which prevents a waste of room; next, the heat is diffused equally in every part of the house; and, further, as this affords an opportunity of admitting so much fresh air into the house as may be wished, without danger from cold or damp, by forming chambers round the pipes communicating with the external air, the mischief arising from stagnant air is partly removed, for I am of opinion that such air is fully as much opposed to the health of vegetables as stagnant water. The effects of free ventilation, I conceive, must be very important to plants in conservatories, particularly in their fructification, and as this apparatus affords the means of demonstrating it, it is my intention to pay particular attention to this principle in the cultivation of Peaches, Grapes, &c. I will also beg leave to observe, that this method of applying heat, is also well adapted for hot walls; for, supposing a wall to be built hollow, say twelve feet high, the steam pipe may be placed to run along the wall at six feet high, and the return pipe at one foot. By these means the heat may be kept up to a very high degree, and equal throughout a great length, and being perfectly dry, the air in immediate contact with the wall will be much warmer than when steam is diffused in the hollow; for evaporation always occasions a rapid dissipation of heat, and this must take place when walls are damp.

Should any of the Gentlemen of the Society be desirous of

seeing the apparatus, I shall have much pleasure in shewing it at any time at this place.

I remain,

Sir,

your humble and obedient servant,

JOSEPH HAYWARD.

Plumstead,
October 12, 1820.

Hague's Steam Apparatus.

Fig. 2.

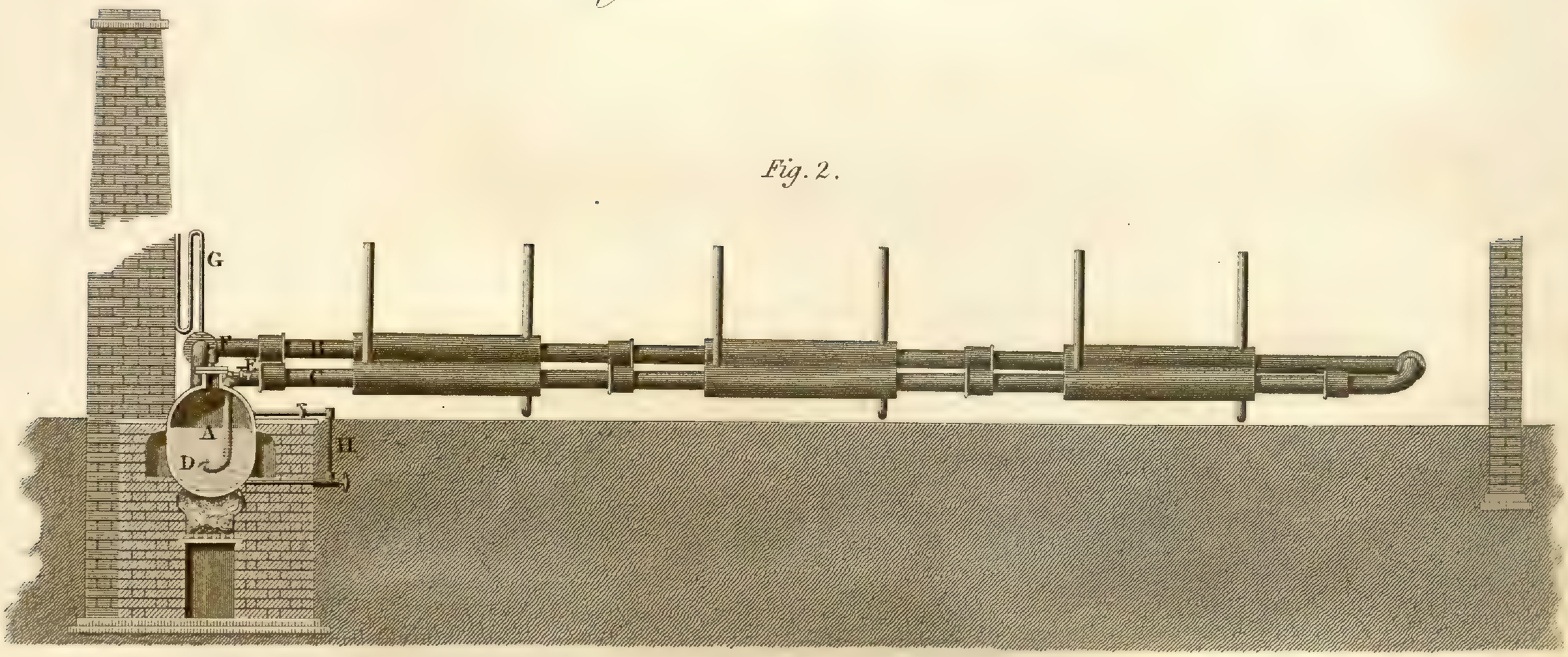
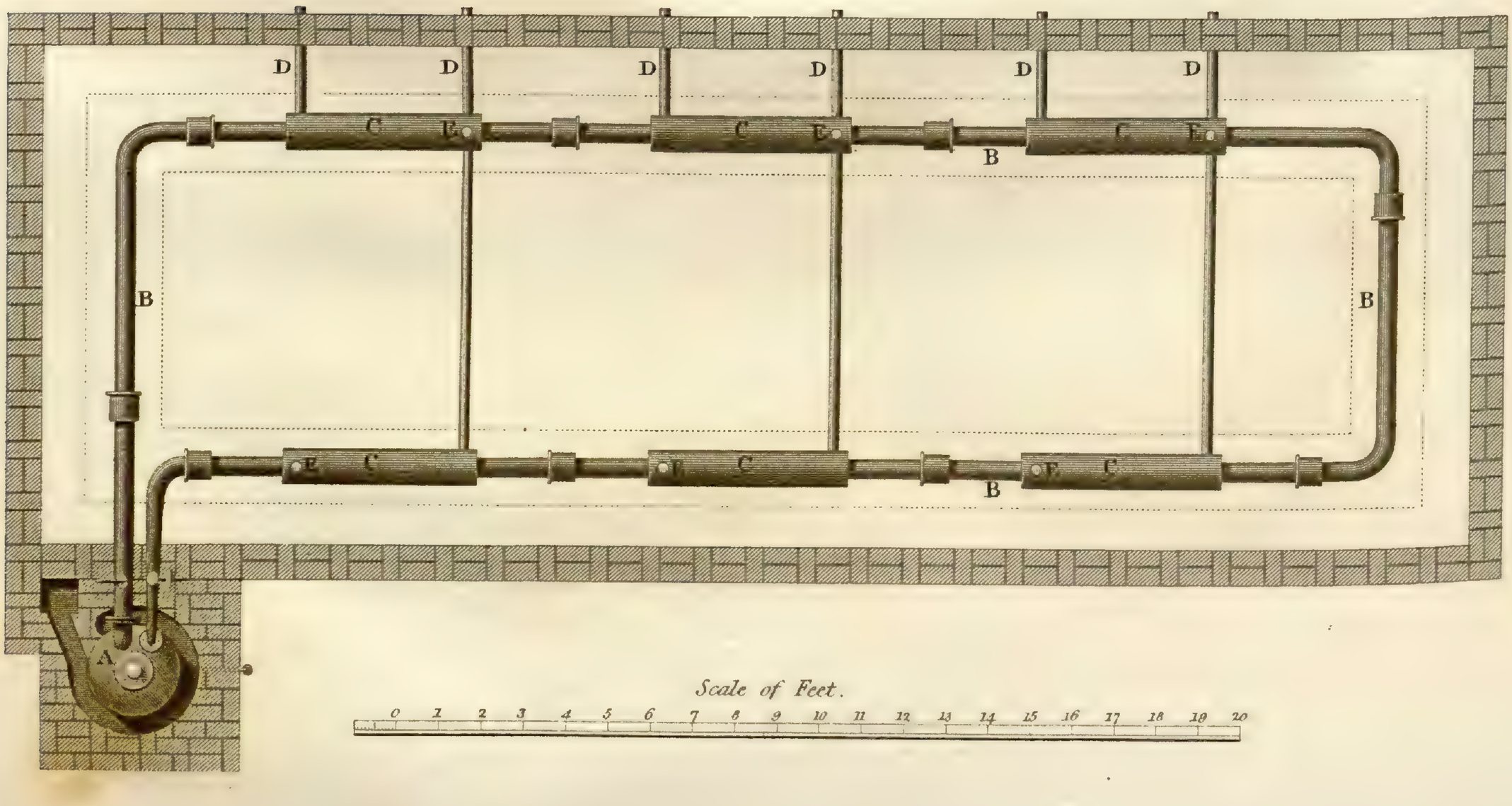


Fig. 1.



Scale of Feet.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Engraved by J.B Taylor

EXPLANATION OF THE PLATE.

Fig. I. Ground Plan.

A. The Boiler.

B. B. B. B. The steam pipes which are continued through the larger pipes, C. C. C. C. C. C.

C. C. C. C. C. C. The larger pipes, which being closed round the steam pipes at each end, form air chambers.

D. D. D. D. D. D. Small pipes inserted at one end of the air chambers, and passing under the floor, communicate with the external air.

E. E. E. E. E. E. Small pipes for the admission of air into the house, after it has been rarefied in the chamber.

Over the pipes, and so as to cover them, as marked by the dotted lines, are placed boards to form a pathway.

Fig. 2. Section.

A. The boiler.

B. The rising steam pipe.

C. The declining return pipe, as inserted in the boiler.

D. The regulating valve.
E. The air cock.
F. The safety valve.
G. The steam gage.
H. The water gage.

LXVI. *Upon the Managing of* Fruit Trees in Pots. *By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read May 8, 1821.

I have more than once mentioned in the *Transactions* of this Society the importance of giving to fruit trees, from which a crop of fruit is required very early in the season, a high degree of excitability, or the power to vegetate very strongly in moderately low temperature, at the period when they are first subjected to artificial heat :* and I have pointed out the advantages of retaining all trees, which are intended to afford such very early crops, in pots.† In the present season, I have endeavoured to ascertain within how short a period, in the ordinary temperature of my Pine stove, plants of the Chasselas and Verdelho Vine could be made to yield mature fruit.

The subjects of this experiment had produced a crop of fruit previously to midsummer, 1820, and in the following month of July, they had been taken from the stove, after having been for some time sparingly supplied with water, and placed under a north wall ; in which situation they remained nearly torpid till autumn, when they were pruned. Early in the winter I observed in them strong symptoms of a disposition to vegetate, though they remained in the cold and shaded situation in which they were first placed, when re-

* See Vol. ii. page 368 ; and page 76 of this Volume. † See Vol. ii. page 369.

moved from the stove: and on the 12th of January I found the buds so much swollen, that I feared the exposure to frost would prove fatal to them; and the pots were consequently removed to the stove. In this, the sudden increase of temperature occasioned every visible bud to unfold itself within a very few days; and on the 17th of the following month, being thirty-six days after the pots were brought into the stove, the berries of some bunches of the Verdelho Grape were so far grown, that I could have thinned them with advantage. In the end of March the Chasselas Grapes became soft and transparent, and in the middle of April some bunches were as mature, and much more yellow, than those of the same kind usually are when first brought to the London market in the spring; though the weather had been, during the earlier part of the spring, dark and cloudy, and consequently unfavourable. The wood of these Vines appeared nearly mature in the end of the last month (April); and by removing them from the stove for a short time, to a cold and shaded situation, and subsequently replacing them in the stove, I do not doubt the practicability of obtaining another crop from them within the present year.

A pot which contains a quantity of mould equal to a cube of fourteen inches, has been found large enough for a Vine whose foliage occupied a space of twenty square feet; water holding manure in solution being abundantly given: and I have seen Grapes acquire a larger size, and other fruits a higher flavour under such management than under any other.

The supposed necessity of frequently removing Fruit-trees,

which grow in pots, to other pots of larger dimensions, appears to present a good deal of inconvenience: but I have readily obviated this necessity, by means which I can confidently recommend to the attention of gardeners. When the plant, or Fruit-tree, is first placed in the pot, in which it is long to remain, I mix with the compost some material, in greater or less quantity, which is capable of ultimately affording nutriment, but which will decompose slowly. In some cases I have used with success slender half decayed branches from my wood pile; and in others I have employed sound chips, chiefly of Apple tree, mixed with mould, and in sufficient quantity to occupy at least one-fourth of the space afforded by the pot. As the roots of the plant increase, the lifeless wood gradually decomposes, at the same time giving food and space to the roots, which consequently do not become injuriously compressed in the pot. I possess a Nectarine tree which has grown nine years in the same pot, and which vegetated more strongly in the present spring than I can recollect it previously to have done. Several successive crops of fungi usually appear upon the surface of the pots under the preceding circumstances; but I have had no reason to think these injurious.

The trouble of conveying water to numerous pots, in hot weather, would be very considerable; but a simple mode of applying the very ingenious contrivance of Mr. LODDIGES, by which water is dispersed, as in showers, upon the foliage of his plants, and which has been described in the Society's *Transactions*,* would reduce this labour to the act of turning a cock: and if it were desirable to diminish, or wholly take

* See Vol. iii. page 14.

away, the supply from any particular pot, this might easily be effected by partially or wholly closing the apertures through which the water is made to escape from the pipe.

LXVII. *Notice respecting several* Vegetables *used as Esculents in North America. In a Letter to* Richard Anthony Salisbury, *Esq. F. H. S. By* M. Joseph Correa de Serra, *F. R. S. &c.*

Read July 17, 1821.

Dear Sir,

It is impossible to foresee the full extent of happy consequences which may result from the labours of the Horticultural Society. It is the first attempt that I know of, towards a confederation of science and practice, directed to raise Horticulture above the state of an empiric art, such as it has been heretofore. Now the encreasing capital of botanical knowledge will furnish new objects on which to try the proceedings of cultivation, and the daily progress of vegetable physiology will no doubt direct these proceedings by clearer and safer principles, extending their application to almost every plant which nature has made fit for the use of man.

I wish this example, first given by your glorious Island, may be followed by all other civilized nations, and propagate the taste for such enlightened pursuits, which add to the comforts and pleasures of mankind, unaccompanied by any counterbalancing evil. If in future I enjoy sufficient leisure, I will try to concur, myself, in an undertaking so analogous to my way of thinking and feeling. For the present, I venture to offer to you the enumeration of a few

plants, not yet cultivated in Europe, which my long residence in North America suggests to my recollection. You may present it to the Society if you judge it anywise deserving that honour.

1st. The young shoots of the *Phytolacca decandra*, (*Botanical Magazine*, plate 931) which the Americans call *Poke*, are brought in quantities to the Philadelphia market, early in the season. They are eaten as a substitute for Asparagus, which they resemble in taste. The plant requires no cultivation, and if it were treated in the same manner as you treat the Crambe Maritima (Sea Kale), the taste of the sprouts would be scarcely distinguishable from the real Asparagus.

2d. The Americans settled on the Washita river, and in the Arkansaw territory, as well as the travellers who have visited those countries, speak in terms of commendation of a species of *Wild Cabbage*, which grows plentifully in those countries, and produces red flowers. MUHLENBERG, the famous American botanist, in his Catalogue of North American Plants (page 61) has given to it the name of *Brassica Washitana*. I wish the Society would attempt the introduction and *civilization* of this vegetable. From the effects produced by cultivation in other plants of this family, we may expect, in a short period, a number of varieties, and some of them probably very valuable.

3d. The *Capsella bursa pastoris*,* or common Shepherd's purse (Thlaspi bursa pastoris, *English Botany* 1485) is an esculent plant in Philadelphia, brought to market in large quantities in the early season. The taste, when boiled, approaches that of the Cabbage, but is softer and milder. This plant

* De Candolle Regni Vegetabilis Systema Naturale, Vol. ii. page 383.

varies wonderfully in size and succulence of leaves, according to the nature and state of the soil where it grows. Those from the gardens and highly cultivated spots near Philadelphia, come to a size and succulence of leaf scarcely to be believed without seeing them. They may be easily bleached by the common method, and certainly in that state would be a valuable addition to the list of delicate culinary vegetables.

4th. *The Hydrophyllum Virginicum* is called by the Americans of the Western States, *Indian Sallad*, or *Shawanese Sallad*, because these Indians eat it as such, when tender. Some of the first settlers do the same. From having tasted it once in Kentucky, I am of opinion that this plant deserves fair trial of cultivation.

5th. *The Apios tuberosa* (Glycine Apios, *Botanical Magazine*, plate 1198) which grows wild in many parts of the United States, produces on its roots a number of tuberosities of a good size, and very good taste. The Indians and American settlers eat them greedily, when they find them; but never, to my knowledge, have attempted to cultivate them, though, in my opinion, they deserve a place among our culinary vegetables. I have not the least doubt of their succeeding well in England.

6th and 7th. The bulbs of the *Quamash* (Scilla esculenta, *Botanical Magazine*, plate 1574) which Nuttal makes a species of *Phalangium*,* with the tubers of the *Psoralia esculenta*,† are the usual vegetable food of many Indian tribes, and were one of the supports of the people composing

* Phalangium esculentum. Nuttal *Genera of North American Plants*, Vol. i. p. 219.

† Pursh *Flora Americana Septentrionalis*, Vol. ii. page 475, plate 22.

the American expedition, through the Continent to the Pacific Ocean, under Captains LEWIS and CLARKE. Both these plants may very probably prove valuable acquisitions ; at all events they are fit objects for the enquiry of the Society.

8th. The Indian nations about Columbia river gather vast quantities of large tubers from the roots of an aquatic plant, which, according to the late Professor BARTON, of Philadelphia, who had seen dried specimens of it brought by Captain LEWIS, is a species of *Sagittaria.* These tubers are an important part of the diet of those tribes. You may see in OSBECK's *Voyage to China,** that similar tubers, from a species of Sagittaria, grow in the watery places about Canton, and if I well remember, are purposely cultivated, turning to profit those naturally unproductive places. Would not this object be worthy the enquiry and attention of the Society ?

If perchance, indications of this nature, directed chiefly to encrease the number of probably useful objects of cultivation, meet the indulgence of the Society ; I shall feel encouraged to continue this kind of communication.

You are perfectly acquainted with my attachment to you, and the sentiments with which I am,

your constant friend,

and obedient servant,

JOSEPH CORREA DE SERRA.

* FORSTER's translation, Vol. i. page 334.

LXVIII. *An Account of an improved Method of raising* Early Potatoes *in the open ground. In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President,*

Read June 5, 1821.

Dear Sir,

The destruction, in the present season, of early crops of Potatoes, by frost in this vicinity, (particularly in the gardens of those who could but ill bear the loss they have sustained) has led me to address to you the following account of some deviations from the ordinary modes of practice, in the culture of that plant which I have found successful, in not only affording plants, which more effectually recover when impeded by frost, but also in furnishing a larger and more early produce under ordinary circumstances.

It has long been known that abundant crops of late and luxuriant varieties of Potatoes may be obtained by planting very small pieces only of their tuberous root: for the plants of those varieties always acquire a considerable age, before they begin to generate tubers, and therefore do not too soon begin to expend themselves. But plants of early varieties, very soon after they first spring from the ground, begin necessarily to expend themselves in the production of tubers; and the size which these acquire within any given period in the spring will be to a great extent regulated by the strength of the plants at the period when they first spring from the soil; and strong plants of such varieties can be

afforded only by sets of considerable size. I have, in consequence, for some years past, selected in the autumn the largest tubers, and those nearly of an equal size, for planting in the spring; and I have found that these not only uniformly afford very strong plants, but also such as readily recover when injured by frost: for being fed by a copious reservoir beneath the soil, a reproduction of vigorous stems and foliage soon takes place, when those first produced are destroyed by frost, or other cause.

When the planter is anxious to obtain a crop within the least possible time, he will find the position in which the tubers are placed to vegetate by no means a point of indifference; for these being shoots, or branches, which have grown thick instead of elongating, retain the disposition of branches to propel their sap to their leading buds, or points most distant from the stems of the plants, of which they once formed parts. If the tubers be placed with their leading buds upwards, a few very strong and very early shoots will spring from them; but if their position be reversed, many weaker and later shoots will be produced; and not only the earliness, but the quality of the produce, in size, will be much affected.

In the spring, when the young plants are just beginning to appear in the rows, I have often found it very advantageous to raise the mould over them in ridges by an operation perfectly similar to that of moulding the plants. Protection has been thus given against frost, and I have not found the period of maturity of the crop to have been in any degree retarded.

It has been contended that there is much waste in the

practice above described of planting large sets; because the old tuber is often found to have lost little in weight, when an early crop is taken up in an immature state: and it has thence been inferred, that a very small part only of the matter of the old tubers enters into the composition of the new. But I believe a false inference has in this case been drawn, and that, under ordinary circumstances, a very large portion of the soluble matter of the old tubers is employed in the formation of the new; for I have proved by experiments purposely made, that the vital union, and community of circulating fluid, between the old tuber, and the plant which has sprung from it, is not so soon dissolved. Some Potatoes of rather large size and early habit were placed in such situations that the fibrous roots only of the plants entered into, or were in contact with, the soil. Thus circumstanced, an abundant blossom appeared, and seeds would have been produced in the manner I have described in a former part of the *Horticultural Transactions*:* but both the blossoms, and the runners which would have formed young tubers, were alike removed. The old tubers, though fully exposed to the sun and air, still retained life, and were obviously supplied with moisture by the stems, which had sprung from them: and the result was ultimately just that which I had anticipated. The plants, after many frustrated efforts to produce blossoms and tubers upon every part of their branches, at last threw their sap back into the old tubers; and a numerous crop of young tubers was suspended from the buds, or eyes, of the old. This did not occur till autumn; and therefore the vital union must have subsisted through the whole summer; and I enter-

* Vol. i. page 58.

tain but very little doubt, that such an union subsists under ordinary circumstances, till almost the whole of the soluble and organizable matter of the old tubers has been absorbed by the new. To what extent this occurs is, however, a point of little conseqence: the important fact of the crop being increased by the employment of large sets has been proved by accurate experiments, in many successive seasons.

I am, dear Sir,

sincerely yours,

THOMAS ANDREW KNIGHT.

Downton,
June 1, 1821.

LXIX. *On the Cultivation of* Pinks. *In a Letter to the Secretary. By Mr.* Thomas Hogg.

Read August 7, 1821.

Sir,

I feel obliged to you for the favourable opinion you were pleased to express of the few specimens of Pink Blooms which I had the honour to exhibit at a late meeting of the Horticultural Society. The health of the plants, and the beauty of the blossoms, I attribute mainly to the mode of cultivation which I pursued with respect to them; a brief account of which I now subjoin, hoping, though the subject matter be trifling and unimportant in itself, that it will afford some gratification to those members of the Society who are fond of flowers, and who feel pleasure in the admiration, at least, if not in the cultivation of them.

I formed my Pink beds and planted them about the middle of October; they were raised six inches above the alleys, to enable the heavy rains to pass off during the winter. The soil consisted of a sandy loam, or, more correctly speaking, of a commixture of yellowish loam, common black garden mould road grit taken from the entrance to the Paddington pond, washed before it was used, and a good portion of rotten horse dung, well incorporated, with a good bottom of dung from the cucumber pits: added to which, I top-dressed the beds in the beginning of May, after weeding and lightly hoeing the surface, with nearly an inch thick of

rotten dung passed through a coarse sieve in which was a small quantity of one-year old sheep-dung, the sweepings of the St. John's Wood Lane sheep-pens.

I watered them freely with the pipe of the water-pot between the rows, when the pods were swelling and showing bloom ; for if the plants lack moisture at this stage of their growth when the weather is generally hot and the ground dry, the flowers seem to languish, and never attain that degree of perfection they would do if the beds were kept moist and cool. The top dressing prevents the ground from cracking, and the rains and water given from the pot passing through it, convey gradually a wholesome nourishment to the plants.

The effect of careful, over careless cultivation was never perhaps more clearly evinced than in an instance in my own neighbourhood in this season. A friend of mine, who had received from me all the superior varieties of Pinks, planted them in a bed in the common way ; and though they were pretty healthy, and sent forth sufficient blooms they presented only a sort of uniform sameness, undistinguished by that pleasing variety of bright colouring, and beautiful lacing peculiar to each, which were so manifest in mine : a common observer would have said that they were Pinks altogether different from mine.

Florists contending for a prize, and anxious to get their flowers large, leave three pods only upon each stem, and four or five stems to a large plant, two or three to a small one, cutting off the rest as they spindle up to flower : as soon as the pods are full formed they tie a slip of wet bass round them, to prevent their bursting irregularly, and place a glass or other covering over them when in bloom, to protect them

from the sun and rain, thereby preserving their colours from being soon faded and tarnished.

If there has been much frost during the winter, and the earth is consequently rendered light and loose when it thaws, the roots, by such extension of the ground, will sometimes be raised almost out of it: in that case it will be necessary, any time about the beginning of April, to tread the mould down lightly with the foot, or at least to compress it firmly round the plants with the hand.

A Pink bed will continue, and flower very well, for two years in succession, though most Florists renew their plants every year by piping the grass, in order to have them young, healthy, and vigorous, and if they are confined to the same plot of ground, they take care to add a little fresh loam, and rotten dung to it, every time they make up a fresh bed.

In preparing compost for the Dianthus tribe of plants, particularly for those which I flower in pots, I always bear in mind what VIRGIL says in his second Georgic about soil:

> " Pinguis item quæ sit tellus, hoc denique pacto
> " Discimus; haud unquam manibus jactata fatiscit,
> " Sed picis in morem ad digitos lentescit habendo."

COLUMELLA and PLINY also, in their works on Agriculture, have given directions for the selection of good soil, which cannot be amended at the present day: the following are some of the tests whereby they distinguish it. " That it is of a blackish colour: glutinous when wet, and easily crumbled when dry; has an agreeable smell; imbibes water, retains a proper quantity, and discharges a superfluity;" &c. Gardeners who cannot meet with such soil ought to use artificial means to form it, by bringing together different kinds:

sand and stiff loam being the principal ingredients required, the one for strong soils, the other for light.

Before I use fresh dug loam, I always take the precaution, to strew over it a little quick lime, well slacked, and in a hot state, to correct any acidity, or decompose any injurious saline compounds. Lime also is an excellent application for the destruction of slugs, snails, worms, and other injurious insects, as well as for the dissolution of inert vegetable matter.

You will excuse the minute detail, which I have entered into more fully than I intended, when I sat down; but as I took the pains to make the experiment, I give it you because I have every reason to be satisfied with the success of it.

Before I conclude, I beg to call to your recollection that I am neither gardener nor florist professionally, but that I commenced the cultivation of flowers in the first instance with a view to amuse a depressed state of mind, and reinvigorate a still more sickly state of body. I therefore solicit your utmost indulgence towards the remarks which I have made on the cultivation of that pleasing little flower, the Pink.

I am, Sir, with great respect

your most obedient humble servant,

THOMAS HOGG.

Paddington,
July 30, 1821.

LXX. *On a Method of raising* Early Cucumbers. *In a Letter to the Secretary.* *By* Richard Vachell, *Esq. F. H. S.*

Read May 8th, 1821.

Sir,

My gardener, John Furrell, having succeeded so well this season in raising *Early Cucumbers* by an easy method which I have not before seen practised, I herewith send you an account of his plan.

Instead of a bed of dung, put together in the usual manner, he formed a bed of faggots four feet high, laid as even at the top as the wood would admit of, and round the faggots he drove stakes, to prevent them from slipping; on the bed thus formed he placed some straw and long litter, then fixed the frame. Over the straw some old tan, which had been used in the Pine pit, was spread, in order to prevent any steam rising through the bed, and on the tan he placed the mould in which he set his plants. The bed was surrounded by linings of hot dung nearly to the height of the lights, and these were removed as often as the declining heat required.

Under this method Cucumbers were cut on the 22d of February, and I have been constantly well supplied with them ever since. I consider this plan much superior to the hollow brick work recommended by Macphail.

I am, Sir, your very obedient Servant,

Richard Vachell.

Coptfold Hall, near Ingatestone,
April 29th, 1821.

LXXI. *On the* Ayrshire Rose. *By* Joseph Sabine, *Esq. F. R. S., &c. Secretary.*

Read August 1, 1820.

The beauty and usefulness of the *Ayrshire Rose* are not sufficiently known. The rapidity with which it covers walls and fences, or the sides of unsightly buildings, with its thick mass of branches and foliage, and the brilliant effect of its numerous white flowers during the month of July, in situations where it is well exposed to the sun, and particularly when trained over the roofs of cottages or garden seats, are such valuable properties that no ornamental grounds should be without it. My inducement, however, for laying an account of this Rose before the Society is not to expatiate on its value, but to endeavour to enable those who may wish to cultivate it, to distinguish it from other Roses with which it has been, and may still be, confounded.

A History of the Ayrshire Rose has been published by Mr. Neill, the Secretary of the Caledonian Horticultural Society, in a paper in the *Edinburgh Philosophical Magazine*;* and communications which I have received relative to the plant from Mr. Robert Austin, of Glasgow, and Mr. George Douglas, of Rodinghead, near Kilmarnock, have enabled me to add some few particulars to Mr. Neill's account. It is stated to have been raised (in what manner I shall hereafter observe on) in the garden of John Earl of

* Volume ii. page 102.

Loudon, at Loudon Castle, in Ayrshire, in the year 1768 or 1769. Mr. Douglas, who at that period had the charge of the estate and gardens at Loudon, has informed me that he gave a plant of the Rose to his friend Mr. Charles Dalrymple of Orangefield, near Ayr, from whose garden it was introduced into the nurseries in his neighbourhood, as well as at Glasgow; it was at first called the *Orangefield Rose*, but subsequently received the more general appellation by which it is now known. It has been considered by some as a native wild plant of Ayrshire, but I believe there is little doubt, that it was first observed in the gardens of that county, where possibly the original plants, or at least some of their earliest offspring, are still to be seen. Mr. Woods did not consider it as indigenous in Britain, since in his *Synopsis of the British Roses*, communicated to the Linnean Society in 1816, and subsequently published in their *Transactions*,* he has not even mentioned it.

From Scotland, it reached the nurseries round London, but was not noticed by any of our periodical works on plants till 1819, when Dr. Sims published an account of it in the *Botanical Magazine*.† His description was made from specimens of plants which cover a building, in the garden of the late Sir Joseph Banks, at Spring Grove; these came from the nursery of Mr. Ronalds at Brentford, and were planted in February 1811.

In January 1820, Mr. Neill, in the paper I have above alluded to, gave, besides a general description of the Rose, a botanical character of it, drawn up by Mr. David Don,

* Transactions of the Linnean Society, vol. xii. page 159.

† Botanical Magazine, 2054.

son of the late Mr. George Don, of Forfar. To the accounts both of Dr. Sims and of Mr. Neill, Mr. Lindley has referred in his *Rosarum Monographia*,* under the heads of Rosa arvensis and Rosa sempervirens.

My opinions respecting the Ayrshire Rose do not entirely coincide with those given in either of the publications I have mentioned. Dr. Sims considered it as a variety of Rosa arvensis, but his figure is certainly not that of the plant he has described, and therefore is likely to lead to error. Mr. Don, supposing it to be a distinct species, hitherto undescribed, has named it Rosa capreolata: and Mr. Lindley refers what he calls the true Ayrshire Rose to Rosa sempervirens. I have some observations to make on all these points, but it will be expedient first to give a description of the Rose, and to detail the particulars in which it differs both from Rosa arvensis and Rosa sempervirens.

The Ayrshire Rose has slender branches, which grow rapidly in one season to a very great extent (thirty feet and upwards), but they are so weak as absolutely to require support; the older branches are greenish brown, with a few small pale falcate aculei growing on them; the younger branches are green, with a tinge of purplish red, and armed with falcate red aculei; those branches which grow to any extent are so slender and flexible as to hang down almost perpendicularly from the last point to which they are nailed or tied. The smaller side branches are very numerous, and are abundantly covered with leaves, so as to form a thick close mass; the plant rarely throws up strong surculi, or root shoots. The leaves are deciduous; the stipulæ long and

* Pages 112 and 117.

narrow, red in the centre, edged with glands, but otherwise smooth; the petioli have a few uncinate aculei and some small glands scattered over them; the foliola are either five or seven in number, the lower pair being much the smallest, they are flat and smooth, shining on both sides, but paler though without glaucousness underneath, ovate, pointed, and simply serrated; the edges, and particularly those of the vigorous leaves, being sometimes tinged with red. The flowers are produced abundantly from the beginning to near the end of July; they rarely grow singly, but are often in threes, and on strong shoots the cymes contain many flowers, from ten to twenty or more; the bracteæ are tinged with red, pointed, waved, edged with glands, and bent backwards; the peduncles are long, fine, and covered with glandiferous setæ; the germen (tube of the calyx) is elliptic, contracted at the top, and covered with setæ, but not so much so as the peduncle; the sepals (leaves of the calyx) have a few fine pinnæ, are covered with glands, have a point at the end extending beyond the bud before it expands, and when the flower opens, they are reflexed; the bud is cream-coloured, the petals are large, obcordate, expanding flat, and their edges are somewhat lapped over each other; the stamina are numerous, and bright yellow; the stigmata are united, porrect, and hairy. The scent of the flower is very pleasant. The fruit when ripe preserves nearly its original shape, is elongated, and not much increased in size.

The characters of the common Rosa arvensis, which do not agree with the preceding, are these: the plant, wherever situated, is not inclined to grow to the same extent; the branches are stronger, thicker, and more able to support

themselves ; the younger shoots have more the appearance of surculi (which often arise from the root), they are glaucous, on the unexposed side of a more blueish green, and on the exposed side purple and deeper coloured ; they bear fewer leaves, and the bush is consequently not so thick and close. The foliola are most frequently seven, and, under similar circumstances, smaller ; they are usually broader in proportion to their length, somewhat folded, not flat, more rugose on both sides, an opaque green above, pale, glaucous, and without any appearance of shining beneath, with serratures less sharp, and the mid-rib occasionally hairy on the under side. The flowers appear at the end of June, and often grow singly ; the peduncles are thicker and stronger ; the germen is shorter and thicker, less contracted at the top, and usually smooth : the sepals are either without pinnæ or with only very slight ones, they frequently have no terminating point, and when the flowers open, are not reflexed ; the flower at its first opening is cupped, and not flatly expanded ; the stigmata are quite smooth, not hairy. The fruit, when ripe, is considerably swollen, and generally nearly globose, but its shape varies in different plants.

The differences between the Evergreen and the Ayrshire Rose are also capable of being distinctly described. The Evergreen Rose is by no means a free grower, and though it extends, when trained against a wall, to some distance, it does not do so, rapidly ; its shoots are equally slender, but not quite so weak, and they are rather more purple ; it forms, however, with its branches and leaves, a very thick bush. The leaves are evergreen, and though similar in shape, are readily distinguished by being much more glossy and shining

on both surfaces, which occasions them to appear altogether of a darker hue; they are also of a thicker substance, have finer serratures, and are more inclined to bend back. The flowers appear from the middle to the end of July, they are less numerous, and generally weaker, but accord in all other points.

On comparing these details with those of Dr. Sims's description in the *Botanical Magazine*, they will be found nearly to agree, except that he makes the germen of the Ayrshire Rose smooth. But his figure of the plant is altogether incorrect; the leaves are represented as rugose on the upper surface and pale underneath, the germen is without setæ, and the sepals are without pinnæ, and not reflexed. These are all characters which belong to Rosa arvensis, and are the chief marks which distinguish it from the Ayrshire Rose. Is it not therefore possible that, by some accident, a branch of the Rosa arvensis may have fallen into the hands of the artist who drew the figure, for it cannot be conceived that so many instances of want of essential correctness could have occurred in copying the specimen received from the plant at Spring Grove, and that I know to be the true Ayrshire Rose.

Dr. Sims has referred (with marks of doubt) the Ayrshire Rose to the Rosa repens of Jacquin's *Fragmenta*,* and to the same plant in Willdenow's *Enumeratio*,† and in Scopoli's *Flora*‡ *of Carniola*. But the Rosa repens of Jacquin is described as having shoots only from two to four feet long, which creep on the ground, throwing out roots as they grow, and sending up short upright shoots, which bear

* Page 69, tab. 104. † Page 547. ‡ Volume i. page 355.

from one to five flowers only, and not large cymes; the petioles are hairy, not smooth: the germen is smooth, and by the figure the leaves are glaucous at the back. It is probably a weak growing variety of Rosa arvensis. The description of Rosa repens by Willdenow accords with that of Jacquin, except that the former makes the shoot two fathoms long; both however refer to the plant of Scopoli, which, from their accounts, is found wild in Carniola, Sclavonia, Hungary, and the adjoining countries.

The character given of the Ayrshire Rose by Mr. David Don, in Mr. Neill's Paper in the *Edinburgh Philosophical Magazine*, agrees well with the plant; but it is not sufficiently extended to distinguish it from R. sempervirens. As compared with R. arvensis, he describes the leaves of that species as ovate, and of the Ayrshire as elliptic, and represents the fruit of R. arvensis as globose, with peduncles nearly smooth, whilst the Ayrshire Rose has ovate fruit and glandiferous peduncles. I am not aware that the R. arvensis has ever been found with peduncles approaching to smoothness, and therefore suppose that the description was made from a plant late in the autumn, for when the fruit approaches maturity the setæ drop off the peduncles, and leave them nearly smooth. Mr. Neill, though he considers the Ayrshire Rose nearly allied to the R. arvensis, seems to suspect that it may be the Rosa prostrata* of De Candolle; but that plant, according to the description of it in the works referred to, has a nearer resemblance to R. sempervirens; it is besides a week growing shrub, and has its flowers usually solitary, and not in cymes.

* Hortus Monspeliensis, page 138, and Flore Françoise, Supp. p. 536.

Mr. NEILL states that the seeds from whence the Ayrshire Rose was obtained were part of a packet received from Canada or Nova Scotia, and it appears by his account, that several plants of it were produced together. Mr. DOUGLAS further mentions, that a person, under the direction of Dr. HOPE of Edinburgh, was sent to Canada to collect hardy plants and their seeds, for several noblemen and gentlemen in Scotland, who defrayed the expense of the collection by subscription, and that the Ayrshire Rose was raised, in 1768 or 1769, from seeds in the Earl of LOUDON's share of the produce of this mission.*

No Rose having the slightest resemblance to the Ayrshire, or to which it can possibly be assimilated, has been brought to us, or described, from the American continent, and as we are tolerably well acquainted with the plants of the northern

* I have received from Mr. JAMES SMITH, nurseryman of Monkwood Grove, near Ayr, an account of the introduction of the Ayrshire Rose into that country, which differs from the history of its origin in the Earl of LOUDON's garden, and, if correct, would entirely remove the difficulty which exists of its being supposed to have been raised from North American seeds. Mr. SMITH's account is, that he perfectly remembers the Rose, since he was eleven years of age, which, at that time (in 1776) was growing in Mr. DALRYMPLE's garden at Orangefield, where it was planted by JOHN PENN, a Yorkshireman, who was employed by the gentlemen of Ayrshire to keep their fox-hounds; PENN was a man of some education, and much attached to gardening, in consequence of which Mr. SMITH became acquainted with him, and received the account now given from himself; his statement was, that having been on a visit to his friends in Yorkshire, he brought the original plant from some gentleman's garden in that country, to which it was supposed to have been introduced from Germany, and planted it at Orangefield, when, from its covering some buildings within view of the high road, it attracted notice, and so becoming an object of curiosity, plants of it were distributed till it became generally cultivated in the neighbourhood.

part of that country, it may, I think, be safely alleged, that the seeds could not have been those of an indigenous Rose of America.

Mr. LINDLEY* is perfectly correct, in his notice of the Ayrshire Rose, in observing that two sorts have been cultivated and sold in the nurseries under that name; the fact is, that one of these is the common R. arvensis, and agreeing, as I have before stated, so exactly with the figure in the *Botanical Magazine*, it is not surprising that the mistake has hitherto remained uncorrected; but to his opinion, that the Rosa capreolata of Mr. DON, which is the true Ayrshire Rose, is so identified with R. sempervirens,† as not to differ from it in any respect, or, in other words, is the same thing, I cannot assent; Mr. LINDLEY was induced, I apprehend, to give this opinion from finding the botanical character of R. capreolata, as drawn up by Mr. DON, accord with R. sempervirens, and from believing the Rose he saw at Kew to be the true Ayrshire; but I have ascertained that the Ayrshire Rose was not in the Royal Gardens at the time when Mr. LINDLEY there enquired for it, the one supposed to be it, being actually Rosa sempervirens.

Having now, as I hope, cleared away the difficulties which have hitherto prevented this charming shrub from being accurately known, which is certainly of considerable importance to those who may wish to possess it, and no garden ought to be without it; a more difficult task remains to be performed, that of ascertaining what it really is. That it cannot be identified with the type of any described species is clear; it is equally certain that it has not yet been

* Rosarum Monographia, page 114.

† Ibid. page 118.

found growing naturally wild any where, so as to enable us to treat it as a species, or as one of those varieties of ascertained species which, from their not being traceable to a single original, but being abundant in the districts where they are found, I consider as a higher class of variation, or as sub-species of a well defined type. If, as is mentioned above, several plants of it were raised together, we have still to look for its parent, which would probably agree with it, if several of its seeds produced similar plants; but it does not seem certain that more than one plant was first produced, and it may consequently be considered as an accidental variety, referable either to R. arvensis, or R. sempervirens.

The Rosa arvensis is a very rare plant in Scotland, and does not, as I am informed, grow wild in Ayrshire, therefore no seed of that species could have come by chance from a native plant, to give it being; nor is it very likely that Rosa sempervirens, which, even in the south of England, is a tender plant, would have freely ripened its seeds in the climate of Scotland, so as to have casually produced the young plant there. I therefore consider it more probable that the new Rose did actually originate in the garden at Loudon Castle, from some seed transmitted to, or collected for, the Earl of Loudon; and I think that the seed must have been that of Rosa sempervirens, which if it was really imported from America, must have been the produce of a garden plant, since the species is exotic in that country.

The Ayrshire Rose certainly has more affinity to R. sempervirens than to R. arvensis, the inflorescence especially accords exactly, the chief differences being that the leaves of the Ayrshire Rose are deciduous, and that it flowers a little

earlier in the season. Under Rosa sempervirens I therefore propose to place it, considering it to be a deciduous and free growing variety of that species; in order to preserve Mr. Don's name, it may be called Rosa sempervirens capreolata.

If a comparison be made of the Ayrshire Rose with Rosa arvensis, in the state we usually find it, the differences between them are so numerous that there cannot be a doubt about the propriety of separating them. But there are varieties of Rosa arvensis in which some of these differences are often less apparent, or altogether assimilated. For an acquaintance with these varieties I am indebted to Mr. William Borrer, with whom I have had an opportunity of personally examining them in their native habitats in Sussex. Rosa arvensis in accidental varieties has sported very much, and has produced some particularly ornamental plants, but those I am now about to mention are not single productions, they are found growing wild in various places unconnected with each other. Of these the first variety has the fruit slightly covered with setæ, but does not differ in any other character from the common Rosa arvensis. In the second, the leaves are elongated, and sharply pointed, and the fruit is also elongated. The third accords with the second, except that the fruit of it is slightly hispid. The fourth has many peculiarities, it is far less robust than the common sort, having weak shoots, which are consequently very pendant, and the joints do not grow straight but in a zig-zag manner; the foliola are smaller, less rugose, flatter, rather bending back, and shining on the upper surface; below they have the glaucousness of the type, though less of it,

LXXII. *Description of the* Steam Pits, *in the Imperial Gardens of Taurida at St. Petersburgh. In a Letter to the Secretary. By Mr.* Martin Miller Call, *Gardener to His Majesty the Emperor of Russia.*

Read February 22, 1820.

Sir,

A Member of the Horticultural Society, on his travels in Russia, visited the Imperial Palace and Gardens of Taurida, at St. Petersburgh, where I have the honour to serve as gardener. By the particular request of this gentleman I send you plans, with descriptions, of a method of giving a regular degree of heat to the roots of Pine Apple plants or any other tender exotic, by means of water heated by steam, an improvement made by me on a plan* lately invented by his Excellency Count Demetrius Zubow, of this city, and which, to this time, has fully answered my most sanguine expectations.

I have had the steam applied for two months to a Pine stove, the results of which I beg to lay before the Society, and if they should deem it worthy their notice, I shall be happy to inform them how it may succeed hereafter.

I am, Sir,

with due respect,

your most obedient Servant,

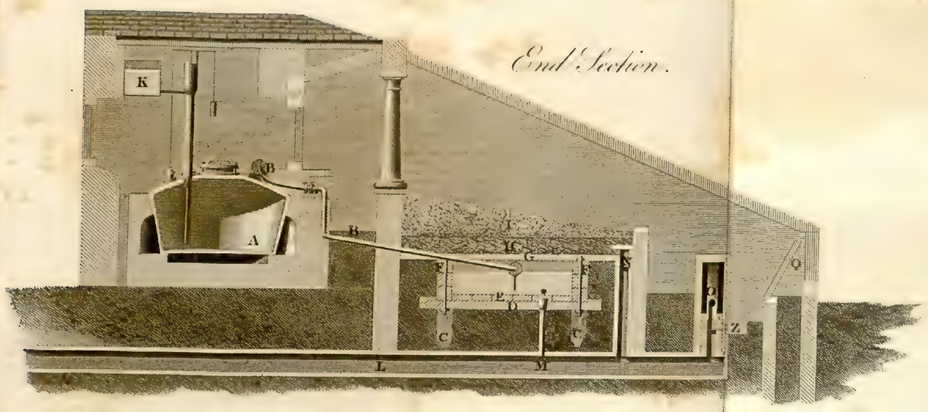
St. Petersburgh,
December 10, 1819.

Martin Miller Call.

* See Horticultural Transactions, vol. iii. p. 430.

Sections and Ground Plan of the Steam Pits in the Imperial Gardens of the Taurida Palace, St.t Petersburg.

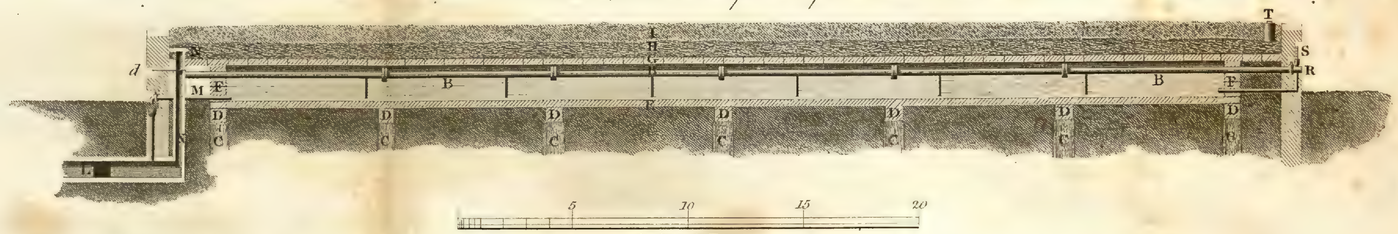
End Section.



5 10
Scale of Feet.

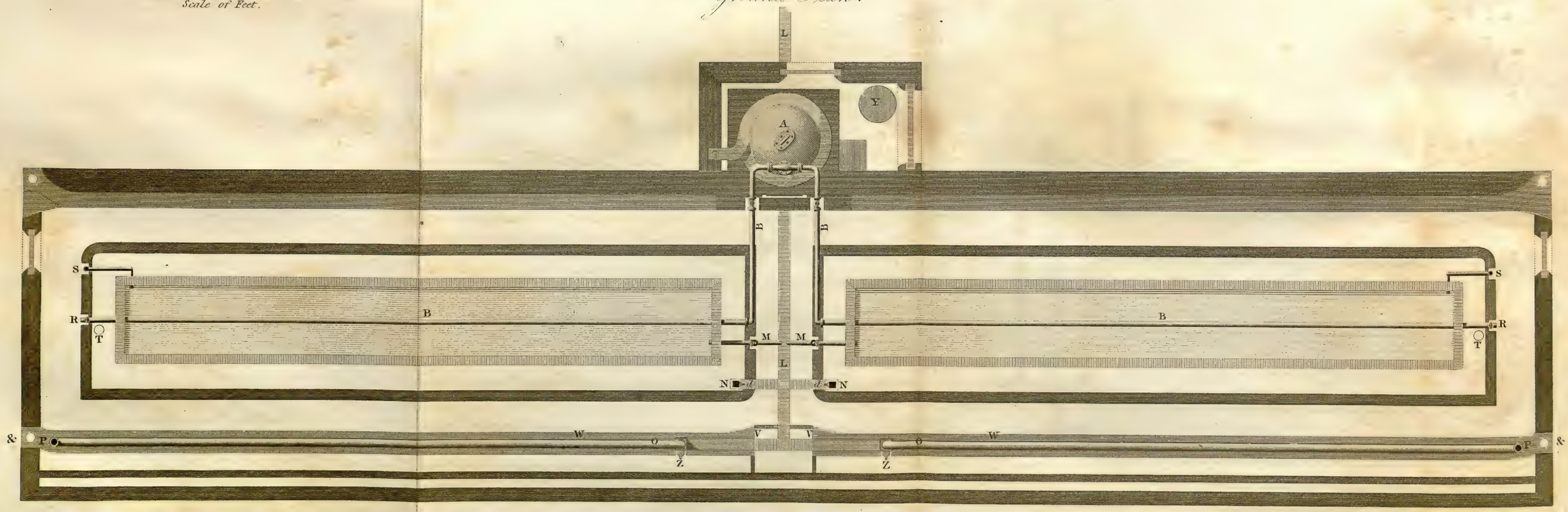
Section of one of the front flues.

Front Section of one of the Pine Pits.



5 10 15 20
Scale of Feet.

Ground Plan.



5 10 15 20
Scale of Feet.

M. M. Gill del.

Engraved by J.B. Taylor.

There is no page numbered 468 in this book.

botanicus

Explanations of the Sections and Ground Plan.

A. A steam boiler, with all the usual apparatus common to steam boilers, which works in general three pounds to the inch, and requires heating six hours, to raise the temperature of the water in the cistern twenty degrees, that is, from 30° to 50° of REAUMUR, or from 100° to 145° of FAHRENHEIT, which produces in the bark from 25° to 30° of REAUMUR, or from about 88° to 100° of FAHRENHEIT. I have found that heating the boiler once a week is sufficient to produce the above mentioned effects.

B. The pipes for conveying the steam from the boiler into the cistern, below the plants, which take a horizontal direction above the surface of the water in the middle of the pit, with perpendicular branches, at the distance of about six feet apart, which convey the steam nearly to the bottom of the water in the cistern.

It should be observed that the pipes must be fixed so as to allow for the expansion and contraction of the metal; and that previous to the admission of the steam from the boiler, (which must not be admitted until the pressure is observed to be three pounds to the inch), the small cock R, at the end of the pipe B, must be opened until the steam has forced its passage through.

C. Posts sunk in the ground to support the cistern.

D. Beams of wood fixed across the posts, to support E, the bottom of the cistern, which is made of three-inch deals, and caulked.

F. Beams of wood laid horizontally on each other, and fastened together with bolts and screws, and caulked, forming the sides and ends of the cisterns, which are supplied at the

end of the pit through a pipe and funnel S, wherein are placed a thermometer and gage for ascertaining as near as possible, the heat, as well as the depth of the water. The cisterns are covered with a second floor G (perforated only where it is over the water) made also of three-inch deals; this floor is covered with fascines H, to the depth shewn in the Sections.

I. Tanner's bark, sand, or earth in which the plants are plunged.

K. Reservoir, supplying the boiler with water, filled from a well Y, in the steam-house, by a small forcing pump.

Remarks.—The cisterns have a small inclination towards the middle of the house, under which part is a drain L, the use of which is *first*, to carry off the water from the cisterns (or likewise from the boiler), through the pipes M, when it is necessary to change it: *secondly*, to introduce and form a current of cold air when wanted below the tan, admitted through the tube N, which is opened and shut as required by the damper at *d*. This current, which forces the hot air to the opposite end, is let out by means of a ventilator T, which is an iron pipe covered with a cap, to open occasionally, and forms an agreeable moist air in the house; and, *thirdly*, for conducting the atmospheric air into the iron tube O, wherein it is heated by the action of the fire, at the time the flues are lighting, and is conveyed to the end of the house, where it escapes at P. W is the front flue, wherein the iron tube O is heated by the fire, which is at V; after the flue has been some time lighted, the tube is shut by means of a damper at Z. This operation not only affords a pleasant succession of heated atmospheric air, but heat is at the same time gained, which

is otherwise lost by escaping in the chimney. In fixing the iron tube in the flue, it should be observed to allow for the expansion and contraction of the iron, so that it may be able to move backwards and forwards in a socket, as shewn in the front flue at X.

In the front of the house the Vines are laid in a horizontal position, and covered with an inclined light, Q, until the season arrives when we wish to force them; the light is then taken entirely away; and the Vines are left in this manner until we perceive the buds have made a general push; by this method we find the eyes break more regularly.

POSTSCRIPT.

February 5, 1821. In the preceding account I have stated that I find heating the boiler once a week produced the desired effect. In making that statement, I omitted to observe that part of the heat of the house was occasioned by the tan wherein the pots were plunged. On the removal of the tan, and the substitution of earth in its place, I have found it requisite, in order to create a proper temperature for the Pine plants, to heat the steam boiler once in every four days. The object in substituting earth for tan was to try how the Pines planted in the earth, without pots, would grow, in comparison with the usual plan. I expected to succeed with the experiment, and the result has answered my expectations; the plants thus treated are much superior in all points.

LXXIII. *An Account of the Cultivation of* Mushrooms. *By Mr.* Thomas Rogers, *Gardener* to Edward Jenkins, *Esq. F. H. S. at Thorpe Hall, near Peterborough.*

Read May 8th, 1821.

Having met with considerable success in the cultivation of *Mushrooms*, both as regards the quantity and the quality of the produce, I am naturally led to ascribe it to the method I have practised. I will first speak of the preparation of the spawn, which I manage in the following manner.

I collect pure cow-dung, not fresh, but such as I happen to find in the park, the fields, or the farm-yard; with this I mix the scrapings of roads, in the proportion of one half to one, adding to it about one-third or a fourth, of vegetable mould, obtained from leaves or decayed sticks. These ingredients being well worked up together, the compost is formed into bricks about nine inches long, three and a half broad, and two thick. The bricks are exposed to the air and sun, and suffered to attain such a degree of solidity, as to bear a considerable pressure, but not to dry hard. They are then removed to a shed for the purpose of being laid up in *strata*. Three or four rows are first placed on the ground with insterstices of about one inch in width between the rows, and the bricks; into these interstices, or spaces, loose spawn, such as is found in the litter of old mushroom beds, is scattered; and over the whole surface of the layer such spawny litter is likewise spread. Should there be

no old mushroom beds at hand to furnish the scatterings, some spawn bricks must be broken to pieces in order to supply them. The first layer having been thus treated, another is put upon it, and likewise interspersed, and covered with spawn and litter from old beds. A third and fourth stratum may be laid on, or more, and regulated in the same manner. The whole pile being completed according to the quantity that is required, it is covered over with hot stable dung, and litter; and in two, three, or more weeks, according to the state of the weather, the bricks are filled with spawn, and may be laid by for use. I will not hazard an opinion, whether the cow-dung itself contains the elements of spawn, or only acts the part of a *matrix*, or receptacle; but this I can state, that Mushroom spawn is generated in other dung, besides horse-dung; for I once found it plentifully in pigeon's-dung. As I have used this preparation of spawn for a length of time, the essence of cow-dung must entirely preponderate in my composition; though the origin of the spawn should at first have been derived from horse-dung. I may add, that, when managed in the manner I have described, it yields spawn as productive as any that can be obtained. I was formerly taught to believe that it was essential to mix a portion of horse-dung in the bricks, but my experience has since convinced me, that cow-dung alone answers the purpose. The spawn is generated in it plentifully, and of good quality.

It is of importance, that the bricks alluded to should not be left in a situation which would cause the spawn to work, an effect which would be produced by moisture, combined with warmth. Therefore, when the spawn is bred, the bricks must be laid in a dry place to prevent the process

of germination. . The spawn must not be suffered to advance towards the rudiments of the mushroom, which consist in little threads or fibres, for in this state it ceases to be useful in spawning a bed. As soon as those rudiments are formed, they must be left undisturbed, or they perish. They will grow into a mushroom on the spot where they are developed ; but when removed or torn up, they are destroyed. A piece of spawn which appears in filaments or fibres, is no longer applicable to a mushroom-bed ; it may produce a mushroom in itself, but can serve no other purpose. The spawn that is to be inserted in a bed, and to receive its development there, must not be gone so far ; but should only have the appearance of indistinct white mould.

The spawn being duly prepared, the beds are next to be considered. I have generally made them in a shed, against the wall, sloping from the wall, downwards ; about two feet high at the back, and perhaps a little less than one foot in front. The materials for the bed are horse-dung mixed with litter, such as is commonly used for hot beds ; dry leaves may be added, or the greater part, if not the entire bed, may consist of leaves. I do not employ the dung fresh, but after it has lain on a dung hill, and has been frequently turned and well worked. There must be no rank heat in it, for the spawn would be killed by an excess of warmth. The temperature of the bed should be between 50° and 60°. From 52° to 55° may be quite sufficient. When the temperature is reduced to a proper state, the spawn is inserted. If the bed happens to be dry, I put a layer of moist manure, of the same quality from the dung-hill, upon the spawn ; or if, on the other hand, the bed be too moist, I put a layer of drier manure over it ; these layers I make

about two inches thick. The mode of spawning is the usual one; namely, the bricks are broken into small pieces, which are inserted at three or four inches distance from one another. The beds are earthed over about one inch and a half thick, and ultimately covered with hay of different thickness, according to the state of the season. I have never made use of fire-heat; but always succeeded in regulating the temperature of my beds by means of covering. I scarcely ever have occasion to water the beds, owing to the materials of which they are composed.

The produce from beds of this description has been ample, and the quality of the Mushrooms excellent, rich, and well-flavoured; they are of great size and thickness, when suffered to grow; one, for example, weighed eighteen ounces. They yield abundance of juice when dressed, or prepared for catchup. There is no doubt that their quality depends upon the manner in which they are nourished: if they are meagerly fed, their flavour and substance will be poor in proportion. Thence artificial Mushrooms are, generally, richer and higher flavoured than those which grow naturally; and again, among the artificial produce, those will surpass which are reared on large and deep beds.

LXXIV. *The Method of Propagating choice* Dahlias *by grafting their Shoots on the Tubers of the Roots of more common kinds. In a Letter to the Secretary. By Mr.* Thomas Blake, *Gardener to* James Vere, *Esq. F. H. S. at Kensington Gore.*

Read August 21, 1821.

Sir,

In compliance with your desire, I send you an account of my manner of propagating *Double Dahlias* on the roots of single ones; should it be thought deserving a place in the Transactions of the Horticultural Society, I shall be gratified by the distinction shewn to my communication.

Necessity is the mother of invention, and so it operated with me in the subject now before you; for, not being able to procure plants of double Dahlias, but having opportunities of obtaining cuttings from my brother gardeners, I was induced to try the experiment of grafting them, in preference to striking the cuttings, which is a tedious process. I first attempted it last year, but began too late to succeed well; for unless the new plant forms eyes for the succeeding year, it is nothing more than annual; and the work must be done early, to effect this object. In the present season I have succeeded beyond my most sanguine expectations, and therefore proceed to give you the details of my practice.

The cutting intended for the graft should be strong, and short-jointed, having on it two or more joints, or buds; it must be also procured as soon in the season as possible;

when obtained, select a good tuber of a single sort, taking especial care that it has no eyes ; with a sharp knife (for a dull edge would mangle the fleshy root, make it jagged, and so prevent a complete adhesion), cut off a slice from the upper part of the root, making at the bottom of the part so cut, a ledge whereon to rest the graft ; this is recommended, because you cannot tongue the graft as you do a wood shoot, and the ledge is useful in keeping the cutting fixed in its place while you tie it ; next cut the scion sloping, to fit, and cut it so that a joint may be at the bottom of it, to rest on the aforesaid ledge ; a union may be effected without the ledge, provided the graft can be well fixed to the tuber, but the work will not then be so neat. It is of advantage, though not absolutely necessary, that a joint should be at the end of the scion, for the scion will occasionally put forth new roots from that lower joint ; the stem is formed from the upper joint. I therefore procure the cuttings with the two lower joints as near together as possible. After the graft has been tied, a piece of fine clay, such as is used for common grafting, must be placed round it : then pot the root in fine mould, in a pot of such a size as will bury the graft half way in the mould ; place the pot on a little heat in the front of a Cucumber or Melon frame, if you chance to have one in work at the time ; I prefer the front, for the greater convenience of shading and watering which are required. A striking glass may be put over the graft, or not, as you please. In about three weeks the root should be shifted into a larger pot, if it be too soon to plant it in the border, which will probably be the case ; for supposing the work was begun in March, the plant cannot go out till the

end of May, so that the shifting will be very essential to promote its growth till the proper season of planting out shall arrive.

The specimens I have sent for exhibition, will shew how perfectly the new plant is formed on, and united to, the old root; you will also observe, that the eyes from whence the shoots of next year are to proceed, are only on that part which was the graft; whilst the old tuber remains solely to furnish nutriment to the new plants from the roots, which issue from its lower end.

I remain, Sir, with much respect,

your obedient Servant,

THOMAS BLAKE.

Kensington Gore,
August 20th, 1821.

LXXV. *Observations on the Cultivation of* Strawberries; *with Remarks on the rapid Formation of their Blossoms and Fruit. In a Letter to the Secretary. By the Reverend* Thomas Garnier, *F. H. S.*

Read September 18th, 1821.

My Dear Sir,

When I had the pleasure of seeing you here a few days ago, you expressed a wish, that I would lay before the Horticultural Society, a detailed account of the method which I have practised for some years of *cultivating the different varieties of the Strawberry*. It affords me great satisfaction to comply with your request, particularly as considerable quantities of my Strawberries have been exhibited at various Meetings of the Society, in the course of the two last summers, and which were generally allowed by the Members present, to have attained no ordinary degree of excellence, both in respect to size and quality.

The observations I am about to submit to the consideration of the Society, are the result of my own experience, and may, perhaps, afford some useful hints to the cultivators of this much esteemed fruit.

The piece of ground I have appropriated for the production of Strawberries, is well exposed to the sun and air; but at the same time is very much sheltered from the violence

of bleak and cutting winds. The soil consists of a dark sandy loam of about two feet in depth, having a very fine white sand for the sub-soil, which I take care never to disturb. In preparing the ground for my crops, I trench it all over two spades deep, and then lay upon the surface a dressing about two inches thick, of rich yellow loam, rotten dung, and bog earth, mixed together in equal proportions, and which is afterwards well dug in with a fork; I then form the beds four feet four inches wide, with alleys at least two feet wide between them. The runners of most varieties are set out eighteen inches from plant to plant, and the same distance from row to row; the Roseberry and Common Scarlet do not require so much room, I consequently set them sixteen inches from plant to plant, and only allow a foot between the rows, which I find quite sufficient for their growth. The sorts I prefer and cultivate chiefly, are the Pine, Downton, Mathven Castle, Hautboy, Hudson's Bay, Wilmot's late Scarlet, Common Scarlet, Keen's Imperial, and two sorts of Chili; but I never suffer any of the varieties to remain in the ground more than one year. Early in August, or as soon as the gatherings are over, I destroy all my beds, and proceed immediately to trench, form, and manure them in the manner before directed, to receive the plants for the crop of the ensuing year, taking care to select for that purpose, the strongest and best rooted runners from the old rejected plants. If at this season the weather should be particularly hot, and the surface of the ground much parched, I defer the operation of preparing my beds and planting them till the ground is moistened by rain.

Such is the simple mode of treatment which I have adopted

for three successive years, and I have invariably obtained upon the same spot, a great produce of beautiful fruit, superior to every other garden in the neighbourhood.

Depth of soil I have found absolutely necessary for the growth and production of fine Strawberries, and where this is not to be obtained, it is useless, in my opinion, to plant many of the best varieties.

It is not generally known, but I have ascertained the fact, that most Strawberries generate roots, and strike them into the ground, nearly two feet deep in the course of one season. The Pine and Roseberry succeed better than any other in stiff and shallow soils, but they should always be planted in an open situation, and not, as is too commonly the practice, in shady and neglected parts of the garden.

Before I close this communication, it may not be uninteresting to subjoin a few remarks on the extraordinary *quick formation of the blossoms and fruit* of Strawberries, and which I believe has escaped the notice of many intelligent Horticulturists. I shall relate those facts only which have fallen under my own observation.

On the 1st of May, 1820, I took up some young well rooted runners of the Mathven Castle Strawberry, and planted them out in a bed, thinking they might produce a small quantity of inferior fruit late in the autumn; but, to my great surprise, on the 3d of July I was enabled to gather a considerable dish of very fine and well ripened Strawberries, and which were sent to London with other varieties and exhibited at the Meeting of the Horticultural Society, on the following day. These plants continued in bearing till about the 20th of August, which was about a fortnight

later than the other crops ; but they certainly were not quite so prolific as those planted out in August.

This year, so late as the 1st of July, I planted out several runners of the Roseberry, they grew so luxuriantly, as in a few days to produce other runners, and on the 7th of September I exhibited a plant to the Hampshire Horticultural Society, assembled at Winchester, bearing blossoms and several fruit, two of which were perfectly ripe, and of their natural size. Three other plants are now growing in the same bed, with above two dozen fruit upon them, but they do not swell and ripen very freely, owing to the very unfavourable state of the weather. From these results I am inclined to believe that if the young and well rooted runners of the Roseberry, Wilmot's late Scarlet, or Common Scarlet, are planted out in beds in an open situation about the beginning or middle of May, they will produce a considerable quantity of fine fruit when all the other varieties have ceased to bear.

In communicating these observations, I hope they may lead to some valuable discoveries ; at any rate they show how large and fine crops may be obtained ; and from the suggestions thrown out, the skilful cultivator may, perhaps, be induced to attempt the experiment of late spring planting, by which he will be able to furnish the dessert with a regular succession of this delicious fruit throughout the autumnal months.

Believe me, dear Sir,

very sincerely yours,

Thomas Garnier.

Bishop Stoke,
15th September, 1821.

LXXVI. *On the Cultivation of the American* Cranberry in dry Beds. *By* Robert Hallett, *Esq. F.H.S.*

Read June 5, 1821.

Having cultivated the *American Cranberry* with great success, in Devonshire, I beg leave to submit to the Horticultural Society a detail of the practice by which I have satisfactorily ascertained that the fruit of this plant may be obtained in *dry*, as well as in *moist situations*, to any extent that may be desired; and since it makes such excellent tarts, and as no other trouble is required to preserve the berries for winter use, than putting them into dry bottles, and corking them up close,* I trust this communication will be acceptable.

In April 1814, I procured four plants of the American Cranberry, *(Vaccinium macrocarpon)*, the kind cultivated by the late Sir Joseph Banks at Spring Grove, whose method, as given in the *Transactions of the Horticultural Society*,† I followed, placing them in a small bed over part of a pond which was fenced off. These plants flourished, and produced me some very fine fruit, which I found so useful that I was induced to attempt to obtain if possible a larger supply; but not having another piece of water, which I could conveniently devote to this purpose, I resolved to try to grow them on a dry bed.

* Those berries keep best which are not over-ripe when gathered.

† Volume i. page 75.

In April 1818, I filled half a dozen shallow boxes, each about eighteen inches square, and four inches deep, with peat earth, and planted in them, at one inch apart, cuttings* of the Cranberry, about an inch and a half in length, placing them in my Melon bed, where they were frequently watered; the cuttings rooted freely and threw out strong shoots, and in the June following they were fit to plant out.

Having collected from a dry hill, where wild Heaths flourished in abundance, a sufficient quantity of peat earth, such as CUSHING in his *Exotic Gardener*† describes under that name, I formed a bed one hundred and fifty feet long by four feet wide. In order to give the plants room to extend their roots freely, I caused eighteen inches in width of the centre part of this bed to be excavated throughout its whole length to the depth of two feet, and having first covered about two inches of the bottom of the trench with small wood, I filled it up with the peat earth, well trod in; on the sides of the bed, to the extent of its width, I put only six inches depth of this mould. About the end of June 1818, I placed one row of plants in the centre of this bed, about two feet‡ apart from each other in the row, these soon put forth luxuriant runners, extending before the winter to the edges of the bed. At the close of the year 1819, the

* The cuttings may be taken from any part of the old plants, for the old wood will root equally as well as the young branches.

† Second edition, page 156. The peat earth used had no part of the turf or sod in it; that had previously been taken off to the thickness of about two inches, and dried for fuel.

‡ If planted four or six feet apart in the row in the centre of the bed, the shoots would soon meet.

bed was covered with the plants, and the runners of the former year had thrown out a number of upright bearing shoots, from which, last year, I gathered several bottles of excellent fruit, much superior in flavour to any imported berries I have ever tasted. In the autumn of 1820, I had the satisfaction to see the entire bed filled so completely by the plants, as to form a mass through which scarcely a weed could penetrate, the whole exhibiting a profusion of bearing branches, which are now (May 1821) putting forth such an abundance of blossoms as not only to make a very handsome appearance, but to promise a supply of berries far exceeding my expectations, On the margin of each side of the bed, I planted a double row of Bilberry or Whortleberry plants* (*Vaccinium Myrtillus*), which are equally thriving, and full of blossoms.

The cultivation of the American Cranberries, as practised at Spring Grove, must be very limited, for few persons have pieces of water which they could conveniently appropriate to that purpose; but by following my method an ample supply may be obtained at little trouble or expense, wherever a bed of peat earth can be formed.

The plants, after the first supply, may easily be propagated to any extent that may be required, for though they root more freely under glass, yet a hot-bed is not absolutely necessary to raise them. I have known the cuttings strike well, and make good plants in pots in the open air, and after being rooted they require no trouble to preserve them. One of the boxes of those raised in 1818, has been left ex-

* These are no ornament to the bed, and were planted in it merely as an experiment.

posed to the open air throughout three summers, and as many winters, and though no care was bestowed on the plants, and the depth of earth did not exceed four inches, yet neither the summer's heat, nor winter's cold affected them, and last year they produced some very fine berries. This proves their hardy nature, and that an exposed situation will not be inimical to the health of the plants. The berries I have likewise found to be as little susceptible of injury from being allowed to remain out late in the season, for on examining my bed in April last, I discovered that out of a considerable number which had not been gathered in the autumn, many were at that time in a perfect state on the branches.

Four feet is the most convenient width for the beds, but by passing the shoots under a path formed of peat earth, wherein they would root, other beds might soon be established on each side. From four to six inches depth of peat earth would be sufficient for such beds, and the paths should be level with them, it being desirable not to drain off the moisture.

Dry heathy commons and wastes would produce a large supply of these fruits, with little labour or expense, either for the markets or for food for moor game.* A single plant would soon extend itself over a large space of ground, if turned up and kept clean till the runners had taken root,

* Several gentlemen in the west of England are anxious to cultivate the American Cranberry extensively, for the purpose of food for grouse, or red game, which they are very desirous of introducing on their heaths and moors; and these birds, by dropping the seeds, would no doubt assist in propagating the plants.

and as no manure is requisite, and little or no weeding wanted, the first trouble is all that would be necessary, except in situations where hares or rabbits abound; these animals are particularly fond of the young plants, and a temporary fence must be made to protect them from their depredations.

Dung is peculiarly injurious to the Cranberry; it absolutely destroys it, as I have proved by a variety of experiments, in which I found that all the plants completely failed which were planted in any compost of which garden mould or dung formed a part. Peat earth is the only soil in which they will flourish: nor can a supply of this very valuable fruit be expected except in situations where the plants will have a due enjoyment of sun and air.

Note by the Secretary.

In the autumn of the present year, 1821, Mr. Hallett sent to the Society a plant removed from his bed of American Cranberries, which, both by the luxuriance of its growth, and the abundance of its berries, satisfactorily proved the possibility of producing this fruit in perfection in *dry* situations.

LXXVII. *Account of a new Esculent Vegetable called* Tetragonia, *or* New Zealand Spinach. *By Mr.* John Anderson, *Corresponding Member of the Horticultural Society, Gardener to the Earl of* Essex, *F. H. S. &c. at Cassiobury, in Hertfordshire.*

Read October 16, 1821.

The very general approval which the *Tetragonia* appears to have received, as a substitute for summer Spinach, has induced me to lay before the Horticultural Society an account of the plant, and of its cultivation as a kitchen garden vegetable.

Though known to Botanists for many years, and notwithstanding its value as an Esculent had been ascertained by the first discoverers of the plant, the *Tetragonia expansa* has been only cultivated as a matter of curiosity till within these few years. The Count d'Ourches, who had obtained seeds of it from the Jardin du Roi, at Paris, first published an account of it as an Esculent* and a notice respecting it which had not been given before, is inserted among the Esculent Vegetables in the *Bon Jardinier*† of the present year.

In the spring of 1820, M. Vilmorin sent a small packet of the seeds to the Horticultural Society, as a novelty; these were sown in the garden of the Society at Kensington, and the excellence of the plant was admitted by several persons

* See Annales d'Agriculture, pour Septembre 1819, page 391.

† See the Bon Jardinier for 1821, page 192.

who tasted it. Last winter, Lord Essex brought some of the seeds from Paris, which I raised, and their produce has been continually used at Cassiobury through the summer, and up to the present time.

Our first knowledge of this plant was derived from Sir Joseph Banks, who discovered it in the beginning of the year 1770, at Queen Charlotte's Sound, in New Zealand, when with Captain Cook, in his first voyage round the world. In the account of that voyage, edited by Dr. Hawkesworth,* it is mentioned amongst the plants of New Zealand as having been met with once or twice, "and resembling the plant called by country people, Lamb's Quarters,† or Fat Hen, it was boiled and eaten instead of greens." Specimens and seeds were brought to England, and its introduction by Sir Joseph Banks to Kew Gardens is recorded‡ to have taken place in 1772. In the sketches made of the plant in the voyage, which are preserved in the Banksian Library, it is called *Tetragonia cornuta*, and Gærtner,§ who had received specimens from the Banksian Herbarium, with this its original name, gave it that appellation when he figured its fruit. It received its present name from Professor Murray of Gottingen, who having obtained the seed, without a knowledge of the history of the plant, published in 1783‖ a description and figure of it, in the *Transactions of the Royal Society of Gottingen*, as a new plant; he afterwards ascertained that it was the same

* Hawkesworth's Voyages, volume iii. page 442.

† Chenopodium album, Eng. Bot. plate 1724.

‡ Hortus Kewensis, 1*st edition*, volume ii. page 178.—2*nd edition*, volume iii. page 211.

§ Gærtner, Fruct. vol. ii. page 483, plate 179, fig. 3.

‖ Murray in Comment. Gott. 1783, page 13, plate 5.

which was introduced by Sir Joseph Banks, as appears by his edition of the *Systema Vegetabilium*,* published in 1784: the specific name of *expansa* was, however, retained, as having been the first printed, and for the same reason continues to be used. Professor Pallas had previously, in 1781,† published a description and figure of it under another name: he found it in the garden of Count Demidof at Moscow, where it had been received from Baron Jacquin of Vienna, as *Tetragonia cornuta*; Pallas conceiving it to be a new Genus, had called it *Demidovea Tetragonoides*; but as he appears to have been wrong in supposing it distinct from Tetragonia, his name has of course been discontinued.

The value of the plant became more known in Captain Cook's second voyage; Forster, who went with that expedition, found it also at Queen Charlotte's Sound, in great abundance, in 1773, and during the stay of the ships at that place, the sailors were daily supplied with it at their meals. He also met with it in the same year, on the shores of Tongatabu, one of the Friendly Islands. The inhabitants of these countries did not appear to eat it, or to know its good qualities. Forster, in the original drawings of his plants, which are preserved in the Banksian Library, as well as in his publications,‡ after his return, named it *Tetragonia Halimifolia*, though the younger Forster, in his § account of

* Linn. Syst. Veg. edit. 14. a Murray, page 467.

† Pallas, Hortus Demidov. Appendix, page 150, plate 1.

‡ See Forster Prodromus Flor. Insul. Austral. page 223; and Forster de Plantis esculentis Insul. Ocean. Austral. page 67.

§ Forster's Voyage, vol. i. page 200.

this voyage, when he notices the plant, calls it *Tetragonia cornuta.*

THUNBERG found it growing wild in Japan, where it is called *Tsura Na*, or Creeping Cabbage; in his *Flora Japonica** he named it *Tetragonia Japonica*, but he subsequently† corrected himself, and referred his plant to *T. expansa.*

Besides the works above mentioned, it has also been described and figured by SCOPOLI,‡ by ROTH,§ and by M. DE CANDOLLE.‖ Several of the writers which I have referred to note the plant as biennial, but in our climate it certainly is only an annual.

From the experience which I have had in the cultivation of the Tetragonia, in the present year, I can venture to recommend the following treatment. The seed should be sown in the latter end of March, in a pot, which must be placed in a Melon frame; the seedling plants, while small, should be set out singly, in small pots, and kept under the shelter of a cold frame, until about the twentieth of May, when the mildness of the season will probably allow of their being planted out, without risk of being killed by frost. At that time a bed must be prepared for the reception of the plants, by forming a trench two feet wide, and one foot deep, which must be filled level to the surface, with rotten dung from an old Cucumber bed; the dung must be covered with six inches of

* Thunberg, Flora Japonica, page 208.

† See Transactions of the Linnean Society, vol. ii. page 335.

‡ Tetragonia expansa Scopoli Deliciæ Floræ Insubricæ, 1786, pars 1, page 32, plate 14.

§ Tetragonia Halimifolia, Roth Botanical Observations and Essays, (in German) 1787, page 48, plate 8.

‖ Tetragonia expansa, De Candolle Plantes Grasses, 1799. vol. ii. plate 114.

garden mould, thus creating an elevated ridge in the middle of the bed, the sides of which must extend three feet from the centre. The plants must be put out three feet apart; I planted mine at only two feet distance from each other, but they were too near. In five or six weeks from the planting, their branches will have grown sufficiently to allow the gathering of the leaves for use. In dry seasons the plants will probably require a good supply of water. They put forth their branches vigorously as soon as they have taken to the ground, and extend before the end of the season three feet on each side from the centre of the bed.

The branches are round, numerous, succulent, pale green, thick and strong, somewhat procumbent, but elevating their terminations. The leaves are fleshy, growing alternately at small distances from each other, on shortish petioles; they are of a deltoid shape, but rather elongated, being from two to three inches broad at the top, and from three to four inches long; the apex is almost sharp-pointed, and the two extremities of the base are bluntly rounded; the whole leaf is smooth, with entire edges, dark green above, below paler, and thickly studded with aqueous tubercles; the mid-rib, and veins project conspicuously on the under surface. The flowers are sessile in the alæ of the leaves, small, and green, and, except that they show their yellow antheræ when they expand, they are very inconspicuous. The fruit when ripe has a dry pericarp of a rude shape with four or five horn-like processes enclosing the seed, which is to be sown in its covering.

In gathering for use, the young leaves must be pinched off the branches, taking care to leave the leading shoot uninjured;

this, with the smaller branches which subsequently arise from the alæ of the leaves which have been gathered, will produce a supply until a late period in the year, for the plants are sufficiently hardy to withstand the frosts which kill Nasturtiums, Potatoes, and such tender vegetables.

The Tetragonia is, I understand, dressed exactly in the same manner as Spinach, and whether boiled plain, or stewed, is considered by many as superior to it; there is a softness and mildness in its taste, added to its flavour, which resembles that of Spinach, in which it has an advantage over that herb.

My whole crop in the present year consisted solely of nine plants, and from these I have been enabled to send in a gathering for the kitchen every other day since the middle of June, so that I consider a bed with about twenty plants quite sufficient to give a daily supply, if required, for a large table.

The great advantage of this vegetable is as a substitute for summer Spinach; every gardener knows the plague that attends the frequent sowing of Spinach through the warm season of the year; without that trouble it is impossible to have it good, and with the utmost care it cannot always be even so obtained exactly as it ought to be (particularly when the weather is hot and dry), from the rapidity with which the young plants run to seed.

There seems considerable difficulty in obtaining the seeds of the Tetragonia; the rapid growth and succulence of the shoots, in consequence of the bed being so highly manured, prevent their ripening, and I am disposed to think it will be desirable to make a separate plantation on a poorer soil, for

the especial purpose of getting seed, or perhaps to retain some plants in garden pots, to be kept stunted and dry, and to be treated as Ice plants usually are, when seed is designed to be obtained from them.

LXXVIII. *On Grafting the* Vine. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read September 18, 1821.

The practice of *grafting the Vine* appears to be very ancient; for it is mentioned both by Cato and Columella,* in a way which shews that it was common in the vineyards of Italy at the period in which they wrote. It must, consequently, have been an operation of easy execution, though it is rarely seen to succeed well in the hands of the modern gardener; who is, nevertheless, certainly much better provided with instruments, and can scarcely be supposed to be inferior in skill, or science, to the cultivators of that period. It is, therefore, probable, that the ancients were acquainted with some mode of operating, of which the modern gardener is ignorant. It is well known that the ancients, in propagating the Vine, employed cuttings which consisted partly of year-old, and partly of two years old wood; and the modern gardener, in deviating from this mode of practice, has adopted one which does not possess a single advantage, and which is in every respect worse. I conceived it probable, in the last spring, that the success of the Roman cultivators, in grafting their Vines, might have arisen from the selection of grafts similar to their cuttings; and the result of the following ex-

* Cato, cap. 42; Columella, lib. iv. c. 29.

periments leads me to believe my conjecture to be well founded. I selected three cuttings of the Black Hamburgh Grape, each having at its base one joint of two years old wood. These were inserted in, or rather fitted to, branches of nearly the same size, but of greater age; and all succeeded most perfectly. The clay which surrounded the base of the grafts was kept constantly moist; and the moisture thus supplied to the graft operated very beneficially at least, if it was not essential, to the success of the operation. A very skilful gardener in my vicinity, to whom I mentioned my intention of trying the foregoing experiment, was completely successful by a somewhat different method. He used grafts similar to mine; but his Vine grew under the roof of the hot-house, in which situation he found it difficult to attach such a quantity of clay as would supply the requisite degree of moisture to the graft: and he therefore supported a pot under each graft, upon which he raised the mould in heaps sufficiently high to cover the grafts, and supply them with moisture.

Some very intelligent gardeners have asserted, that they have seen the berries of some of the smaller varieties of Grapes enlarged by the use of stocks of larger or more luxuriant varieties. I possess no information relative to this statement; and the object of this communication is merely to point out the means by which new varieties may be introduced into the forcing-house without loss of time, or produce.

The grafts which I used consisted of about two inches of old wood, and five of annual wood, by which means the

junction of the new and old wood, at which point cuttings most readily emit shoots, and receive nutriment, was placed close to the head of the stock; and a single bud only was exposed to vegetate.

LXXIX. *On the Production of a* Hybrid Amaryllis. *In a Letter to the Secretary.* *By* James Robert Gowen, *Esq.* *F. H. S.*

Read August 7, 1821.

Dear Sir,

I hasten to comply with your request to be furnished with the history of the splendid *Hybrid Amaryllis Regina-vittata*, which, by Lord Carnarvon's desire, I sent to the Horticultural Society a few days ago. It was raised by me in his Lordship's garden in the summer of 1818, from seeds of Amaryllis vittata, which I had carefully impregnated by the pollen of Amaryllis Reginæ. As the operation had long been premeditated, the two bulbs were by proper management brought to expand their flowers on or about the same day, and such minute attention was paid to the extirpation of the anthers of the A. vittata, previously to the expansion of the corolla, and development of the pollen, that self impregnation became wholly impossible. The pods swelled well, and forty one perfect seeds were produced; which all grew. In the course of a few months, when the leaves of the young plants began to assume some breadth, a distinction was remarked between them and the leaves of seedlings of A. vittata of about the same age, sufficiently decided to enable both the gardener and myself to distinguish between them at a glance. The mule leaves were of a deeper and more glossy green, and were covered with a slight glaucous bloom, which quickly

disappeared by handling. They were also free from a brownish tint, which is conspicuous towards the extremities of the young leaves of A. vittata, and devoid of the thin edge of the latter, which gives them somewhat the appearance of being surrounded by a whitish membranous margin. Under the good management of Mr. James Croghan, Lord Carnarvon's gardener, these bulbs grew rapidly, with magnificent foliage, their progress being continually watched by myself. The interest excited in them was the greater, because their flowering was calculated to decide the doubtful origin of Amaryllis Johnsoni, whose hybrid quality had been disputed. The first flower showed a few days ago, and was sent to you as soon as fully expanded. I believe that you will allow that the nicest observation can detect no point of distinction between it and the flower of Amaryllis Johnsoni. A second bulb is now in flower here; it is not quite so robust as the one sent to you, but it is in every other respect a fac-simile of it.* All the other seedlings will flower in the course of this autumn, or early in the following spring; and as they resemble each other perfectly in foliage, judging from the two already blown, little variation of flower can be expected.† The hybrid origin of A. Johnsoni I therefore now consider as placed beyond a controversy, but the tradition of the Liverpool garden to be incorrect, so far as regards its true paren-

* The flowers were compared with those of Amaryllis Johnsoni, growing at Mr. Colvill's garden at Chelsea, and no difference was perceptible. *Secr.*

† Note. November 14, 1821. Seven of the bulbs have flowered in the course of the summer and autumn. No marked distinction has been observed between them. The last but one which flowered had a broader and more prolonged central stripe.

tage.* The fact is interesting, because, either when self-impregnated, or impregnated by the pollen of other species, A. Johnsoni is a free seeder. I have raised seedlings from it by its own pollen, and have a dozen seedlings from A. vittata impregnated by it, which will be three fourths vittata and one fourth Reginæ; and Mr. HERBERT has seedlings from it by the impregnation of other Amaryllides. It remains to be seen whether its own pure seedlings will establish their claim to be considered as species, by strictly adhering to its type, or whether, in the course of a few generations, the influence of the male parent, A. Reginæ, now so strongly shewn, will wear out, and A. vittata re-appear amongst them; or whether, according to Mr. KER's notion, as stated by him in the *Botanical Register*,† some will "revert to the single likeness of either parent, or assume new appearances in endless vicissitude."

My opinion upon the subject leans to the notion that no truly hybrid plant is capable of producing fertile seeds, and, consequently, that where a supposed hybrid actually propagates, as in the present instance, it may be inferred that its parents were not originally distinct species, but are varieties rendered permanent by the long continued influence of dissimilar soils and climates. Extraordinary changes of form, and great diversities, of colour in the corollas of flowers are daily produced in our gardens by cultivation, even unaided by differences of temperature. Is it

* See note by the Secretary at the end of this communication.

† Observations on the Rhododendron hybridum, in the Botanical Register, Vol. iii. page 195.

then unreasonable to suppose, that the same species of Amaryllis, seated in the hot and moist climate, and vegetable soil of the basin of the Amazons, in the arid sandy plains of central Brazil, or in the cool regions of its mountainous districts, should, in the course of a long succession of ages, have assumed the different appearances under which we now see them? differences, in many of them, more apparent than real, in relative proportion of parts, not in structure, and scarcely marked enough for the purpose of satisfactory botanical distinction.

Believe me, Dear Sir,

most sincerely yours,

James Robert Gowen.

Highclere, July 28, 1821.

Note by the Secretary.

The following account of the origin of the Amaryllis Johnsoni has been communicated to me by Mr. John Shepherd, Curator of the Liverpool Botanic garden:

"Mr. Johnson, who was a manufacturer of the gold hands of watches, resided at Prescot, about eight miles from Liverpool; he was very fond of his garden, and paid much attention to the plants which he cultivated in a small green-house, as well as in the open border. About the year 1798 or 1799, according to his statement, having impregnated *A. vittata* with the pollen of *A. formosissima*, from the seeds of the impregnation he raised several plants, most of which were lost by an accident which destroyed his green-house, in

1802. Only five or six bulbs were saved; of these, two were given at the time to Mr. SHEPHERD, one to a gentleman in the neighbourhood, and the remainder to Mr. LEE of Hammersmith. Mr. SHEPHERD's bulbs flowered in 1802, and produced seed; with their pollen, as well as with that of A. Reginæ, Mr. SHEPHERD impregnated A. vittata, and contrariwise A. Reginæ with the pollen of A. vittata, and obtained seeds from each operation, from which seeds plenty of bulbs were raised, all of which have gone by the name of A. Johnsoni, the London nurserymen having derived their plants from the Liverpool collection."

Doubts have been entertained of the accuracy of this account, as far as relates to the impregnation of A. vittata by A. formosissima, because the most skilful cultivators of the present day have in vain attempted to produce a fertile seed from such impregnation. It seems they will not breed together. A. formosissima has never been known to mature its seeds in our stoves, and various attempts made (by Mr. GOWEN, at Highclere, and Mr. WILLIAM HERBERT, at Spofforth) to impregnate other species by its pollen, have ended in disappointment. As all the plants now in the gardens under the name of A. Johnsoni exactly resemble Mr. GOWEN's hybrid, and cannot be distinguished from it, it seems to follow that they are all derived from those raised in the Liverpool botanic garden, between A. Reginæ and A. vittata, or that JOHNSON's bulbs were of the same breed; and that if he actually succeeded in raising a hybrid between A. vittata, and A. formosissima it has been lost; for the very remarkable form of the corolla of A. formosissima could hardly have failed to have had a marked influence upon that

of the hybrid derived from it. In reply to these observations, Mr. Shepherd has stated, that, as far as relates to Mr. Johnson's production of the hybrid, he has no doubt of the correctness of his account, for that he was too well skilled in plants not to know A. formosissima from A. Reginæ; and besides that, as Mr. Johnson had no stove he was not likely to have cultivated A. Reginæ, which would have required more heat than his green-house afforded, the temperature of which was, however, well suited to A. formosissima, that being a green-house bulb, whilst A. Reginæ only grows well in a stove.

It is much to be regretted that the extended size of the beautiful hybrid produced by Mr. Gowen renders it impossible to give in the Transactions of the Society an engraving from the drawing which has been made of the flower sent by him to the Society. I am not aware that any figure has yet been published of this curious Amaryllis, except one on a reduced scale, under the name of Amaryllis spectabilis, in the *Botanical Cabinet* of Messrs. Loddiges, Vol. ii. plate 159, where it is conjectured to have come from the Brazils, its hybrid origin not being noticed.

LXXX. *Account of some* Standard Fig Trees *in a Garden at Sompting, near Worthing, in Sussex.* By Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read October 2, 1821.

The south-western part of the county of Sussex is famed for the production of good *Figs* on standard trees. In a recent visit to that county, a garden was mentioned to me as having been long remarkable for its Fig trees; I therefore visited it, and am enabled to lay the following particulars respecting it before the Horticultural Society.

The garden in question is attached to a small cottage in the village of Sompting, and is the property of Mr. James Kennard, a farrier, who lives in the cottage, and manages the garden himself. Sompting is nearly three miles from Worthing, and is situated on the high road leading from Brighton to Arundel, from both which places it is ten miles distant. The garden is contiguous to the north side of the road, from which the Fig trees may be seen growing above the stone wall which separates them from the road. The situation is immediately on the southern foot of the South-down hills, and not quite two miles in a direct line north from the sea. The garden has a very gentle slope to the south, and is immediately protected on the north by a thick grove of Apple

and Plum trees. The climate of the village must be particularly mild, for I observed in several instances Myrtles growing against the walls of houses, and the different tender evergreens in the gardens were very vigorous and healthy. The soil where the Fig trees grow is a rich garden mould about fourteen inches deep, lying over a hard binding gravel, into which the roots do not penetrate far.

The number of the Fig trees is fourteen ; they occupy the principal part of the garden, which is very small, and are in perfect health ; their average height is about ten feet, and if any of the larger ones were detached, they would cover a space of twelve feet in diameter ; their stems are not large, the plants being rather bushes than trees, for the branches spread in all directions from the root ; these are propped up by stakes, but many of them are suffered to hang near the ground.

Mr. KENNARD, who is a very intelligent man, gave the following account of the trees, and his management of them. They are about forty years old now, for they were twelve years old when he purchased the property, nearly thirty years ago ; he calls them the brown Turkey Fig,* but considers three of the trees (which he believes to be of the same kind as grow in the Fig garden at Tarring) as inferior to the others. Since he has had the garden the trees have never failed to produce what may be called a crop, though it has varied in quantity in different years. The Figs usually begin to ripen

* They are the Brown Naples, or Italian Fig, figured in BROOKSHAW's *Pomona Britannica*, folio edition, plate 74.

in the latter end of August, or early in September, and continue to afford fruit during part of October; this year, from the lateness of the season, the first produce will be three weeks later than usual. The crop is from the spring-formed Figs, sometimes a few of the autumnal fruits which are not destroyed by the winter ripen a short time before the others, these are smaller in size, but much richer.

When the leaves have fallen from the trees he clears the ground under them from whatever rubbish or weeds may have collected there during the summer, and covers the surface with dung, which he digs in amongst the roots in the spring. The annual shoots, which are from six to twelve inches in length, are often killed back in part by the winter frosts. He removes the dead wood, but otherwise prunes little, for he thinks any cutting is injurious to the tree.

Tarring, the place above mentioned, is a small village about two miles to the north-west of Worthing. In a garden there, now the property of Mr. Thomas Lowd, a great number of Fig trees were planted about thirty-five years ago. They are principally of one sort, the long Blue Fig, which is generally known under the name of the Blue Burgundy Fig, though there are a few of the White Marseilles amongst them. These trees are generally about ten feet high, and from fifteen to twenty feet in diameter; several of them, like those at Sompting, are rather bushes than trees, as they send up many strong shoots from the root. The garden is now much crowded as well from the great increase in the size of the Fig trees, as from other fruit-

trees having been planted amongst them. The annual supply of fruit is very considerable, and is consumed by the markets of Brighton and Worthing.

LXXXI. *Notices of New or Remarkable* Varieties of Fruits *ripened in the Summer and Autumn of the Year* 1820, *which were exhibited at the Meetings of the Horticultural Society.*

The plan which was suggested by the President, in the Second Volume of the Society's *Transactions*,* and first adopted in a former Part of this Volume,† of bringing into one view all the new or remarkable varieties of Fruits which had been submitted to the Society in the course of the preceding year, has been found to answer fully the purpose intended; and it is very gratifying to find, that in every instance where the Fruits so mentioned have been again before the Society, the observations upon them have been confirmed; but should it at any time be proved, that imperfect or incorrect accounts have been given, care will be taken to correct the mistakes, in some future annual report.

Strawberries.

Mr. James Grange of Kingsland exhibited specimens of a *Strawberry* which has become common in the London market, and is called the *Rostock*. The same variety was received from the Rev. Whitehall Whitehall Davies, grown in his garden at Broughton Hall, near Wrexham, under the name of the *Vernon*. On enquiry, it appears that Mr. Davies received his plants from the garden of Mr. Vernon in that neighbourhood, and not having any name

* See Vol. ii. page 210.

† See page 203 of this Volume.

with them, he gave that of the person from whom he obtained them. At the request of the Secretary, Mr. DAVIES has made particular enquiries as to the origin of the variety, and finds that it was raised by Mr. GEORGE DALE, gardener to FRANCIS TOMKINSON, Esq. at Bostock, near Middlewich in Cheshire, and from him Mr. VERNON received his plants. The same account of its origin has also been received from Mr. SPLATT, nurseryman at Watford, in Hertfordshire, who lived in the neighbourhood of Middlewich at the time it was raised. The name therefore should be *Bostock*, and that by which it is known in the London market doubtless arose from the mistake of a letter. The variety is of the Carolina kind, of the same round form, but usually larger; the seeds are numerous, and prominent on the surface, the flesh is white, and generally hollow in the centre. It is a handsome looking fruit, but inferior to the best varieties in flavour. It is a very abundant bearer, forces particularly well, and from the prominence of its seeds bears carriage better than almost any other sort; on this account it is valuable for the London market.

Specimens of the *Mathven Castle Strawberry* were received from the Rev. THOMAS GARNIER, of Bishop's Stoke, near Winchester. Fruit of this variety had been formerly received from Mr. MILLER, gardener to Lady RUMBOLD, at Sydney House, near Southampton, sent by Mr. PAGE, nurseryman of that place. Mr. MILLER stated, that it was raised by Mr. BISHOP, gardener to Colonel SMYTHE, at Mathven Castle, in Perthshire, in 1814, and that it fruited for the first time in 1816. The fruit is very large, rather flat, and very much knobbed, the fairest specimens resemble the Pine; of a vivid

scarlet all over, even the ripest seldom becoming dark red or crimson. The calyx is hairy, and reflexed when the fruit is quite ripe. Flesh very soft, bright red throughout, and in flavour resembling the old Scarlet; seeds yellow, few, small, and deeply imbedded in the flesh. It bears abundantly if planted in a light, but does not succeed in a heavy soil, and the trusses carry the fruit high from the ground. It ripens early in June, and continues bearing till the end of July or beginning of August.

Cherries.

Specimens of Mr. Knight's *Early Black Cherry* were exhibited from the garden of the Society. This Cherry has been already described by Mr. Knight in the Society's *Transactions* (Vol. iii. page 211,) but as it certainly will be much cultivated in gardens it is desirable again to notice its qualities, since they have been proved under the immediate eye of the Society. The fruit is fully ripe at the time when May Duke Cherries, on similar aspects, have only acquired the colour which they have when they are first offered to sale in the London market, in which state they are very inferior fruit; at that time the Early Black Cherry has assumed its rich dark hue, and its flesh is then firm and juicy, and tolerably rich. The blossoms are produced in abundance before those of any other sort. All the trees of it are of course young, so that the steady productiveness of the variety remains to be ascertained.

Mr. Knight sent specimens of the *Waterloo Cherry*, for the purpose of showing how great an improvement had been produced in it by the increased maturity of the tree. It had greatly improved in size, being larger than the Black Eagle;

and in richness of flavour was equal, if not superior, to the very best varieties. Mr. KNIGHT, in his communication respecting this Cherry, published in the Society's *Transactions*,* mentions a remarkable livid colour which it assumed at one period in its approach towards maturity, and conjectured that it might form a characteristic feature in the immature fruit. Subsequent experience has, however, shewn that this peculiarity was not permanent, it having gradually ceased to appear, and the fruit now reddens and ripens like other varieties. It also ripens earlier than it did when Mr. KNIGHT's observations upon it were published.

Mr. JOHN MACFARLANE, gardener to Sir HERBERT TAYLOR, at Fangrove, near Chertsey, sent specimens of the *Cérise quatre à la livre*, the produce of a tree received from France. It appears that this extraordinary name had been given by the French from the gigantic character of the leaf, before they had seen the produce of the tree, since the fruit proves to be particularly small. It is heart-shaped, of a pale transparent yellow colour, with a faint stain of red on the exposed side; the flesh is of firm consistence, sweet and pleasant, but without any peculiar richness: the stalk is very long, and the stone large. Those ripened on trees received from France, in the Society's garden, have been found in every respect to agree with the above account; consequently, except as an ornamental tree, which its large foliage and vigorous growth entitle it to be considered, it will scarcely be allowed a place in the garden.

* Vol. ii. page 209.

Peaches.

John Braddick, Esq. sent from his garden at Thames Ditton, specimens of the *Flat Peach* of China. This fruit is of truly singular form, and perhaps will be best described as having the appearance of a Peach flattened by pressure at the head and stalk, its upright diameter taken through the centre from eye to stalk, being eleven sixteenths of an inch, consisting wholly of the stone, except the skin; that of its sides is one inch and one-eighth, its transverse diameter being two inches and a half. The head of the fruit is cracked in such a manner as to look like a broad and rather hollow eye of an irregular five-angled (or lobed) shape surrounded by the appearance of remains of the leaves of a calyx; the whole surface of this eye is roughly marked with small irregular warted lines, like the crown of a Medlar. The colour of the skin of the fruit is pale yellow, mottled or rather speckled with red on the part exposed to the sun, and covered with a fine down. The flesh is pale yellow, having a beautiful radiated circle of fine red surrounding the stone, and extending far into the fruit. The stone is flatly compressed, small, rough, and irregular. The consistence and flavour of the flesh is that of a good melting Peach, being sweet and juicy, with a little noyau flavour or bitter aroma. This Peach is cultivated in China, representations of it being continually seen on the papers and drawings received from that country, and it is well known at Canton, where it is esteemed as a good fruit. A figure of it is now given, the drawing for which was taken from the specimens which were exhibited

Flat Peach of China.

to the Society. The plant which bore the fruit was sent to Mr. Braddick from Mr. Kirke's nursery, under the name of the *Java Peach*, Mr. Kirke received it through a friend from Java, to which country it had no doubt been carried from China. It is believed that this is the first instance of its having ripened in Great Britain. The Society is in possession of plants of it, imported from China.

Mrs. Thoyts of Sulhamstead House, near Reading, sent specimens of a *Seedling Peach*, raised by her gardener. It is a large fruit, resembling the variety called Smith's Newington. It is globular, depressed on the head, slightly cleft, with a corresponding depression on the opposite side. Skin a clear pale yellow where shaded, with a blush of red somewhat mottled on the exposed side, covered with a fine short down. Flesh pale yellow without any stain of red, perfectly melting, juice abundant, sweet, with a rich vinous flavour; stone small, oval, rather blunt, parting freely, with only a few fibres adhering. This very fine new variety has been named the *Sulhamstead Peach*.

Mr. Joseph Kirke exhibited specimens of the *Rosanne Peach*, the produce of a standard tree in a south border, in his garden at Brompton. This, as has been observed by Duhamel, is a variety of the Yellow Alberge, but has not been sufficiently distinguished from it by the British gardener; it ripens a little later in the season, and is superior to the Alberge in quality. It is noticed here from the circumstance of its bearing in our climate as a standard. The fruit, it is true, in such circumstances, is small, but it ripens well, and acquires a fine colour and a rich high flavour. If a melting Peach with yellow flesh, of the old kinds at present

known, should be desired in a garden, this deserves the preference.

Melons.

Sir Thomas Frankland sent from his garden at Thirkleby, in Yorkshire, specimens of a *Melon* of great excellence, called by him the *Green-fleshed Egyptian*. It is quite round, and very regularly lobed; the skin is pale, almost white, very thin, smooth, with a few reticulations, but some specimens are without this addition. The flesh is semi-transparent, green next the skin, and becoming white in the centre; it is perfectly melting, rich, sweet, and high flavoured. The sort is an abundant bearer, very handsome, and of a size which makes it desirable for the table, each fruit weighing from two to three pounds. Sir Thomas Frankland received the seed, about the year 1808, from the present Archbishop of York. Like all the green Melons the flesh of this is more digestible than that of the red varieties, and this is considered as having that quality more remarkably than any other. It has also the merit of ripening its flesh very close up to its skin, and consequently of affording a much larger eatable portion, for its weight, than is usual.

James Hammond, Esq. sent from his garden at Potter's Bar, near Barnet, specimens of a *Levant Melon*. This variety varies considerably in its form, some being oval, divided in lobes, while others are nearly round. The most usual form, however, is oval, slightly lobed, the lobes being very broad. Skin yellow, generally smooth, sometimes reticulated; but never much so. The flesh is green, melting, rich and very high flavoured. This excellent Melon is subject to considerable variation in its quality, the produce even of the

same plant differing greatly from each other in flavour; whilst some are equal to the above description, others of them prove of very moderate character; it is however a good bearer, and being much earlier than other sorts usually cultivated, it is noticed notwithstanding the defect alluded to.

Grapes.

Mr. Isaac Oldaker, gardener to Lady Banks, at Spring Grove, sent specimens of the *Black Corinth Grape*. This is the variety which is also called the Zante Grape, and known, in its dried state, as the Black Currant of the shops; forming a considerable article of export from Zante and other islands of the Levant. The bunch is small, the berries about the size of a pea, with a few much larger interspersed. It is without seeds, very juicy, and though not high flavoured, is extremely refreshing and pleasant. The Vine makes strong wood, and is a free bearer under glass, producing from three to five bunches at each shoot. The first introduction of this Vine into this country was in the year 1817, when Prince Cornato sent twenty-one plants and some cuttings packed in earth from Zante to Sir Herbert Taylor, for the Queen. When unpacked, all the plants were in leaf, and the buds of many of the cuttings were bursting. Prince Cornato sent very particular directions for its cultivation, which were given, with a plant, to Sir Joseph Banks. Among other points to be attended to, he recommended great care to be taken in protecting it from cold in the winter; it was therefore planted in the hot-house at Spring Grove, where it has grown luxuriantly, and ripened its fruit well. High temperature, however, does not appear

to be necessary to it, for Sir Herbert Taylor having neither hot-house nor green-house, planted two of the Vines against a south wall in a light soil in his garden at Fangrove, near Chertsey, which have thriven extremely well, borne plentifully, and ripened their fruit somewhat earlier than other sorts in the same situation, though all the berries on the bunch have not ripened equally well. It is necessary to protect the fruit very early from birds and flies, which seem particularly fond of it.

Specimens of a *Seedling Grape* were received from Mr. Charles Harrison, gardener to James Stewart Wortley, Esq. at Wortley Hall, in Yorkshire. The bunch exhibited weighed upwards of two pounds, and its general appearance was that of the Black Hamburgh. It is well shouldered and tapering, the fruit being regularly distributed. The berries are large, rather oval than round, somewhat broadest at the head, with an irregular surface; colour of the skin dark purple, and very glossy. Flesh thick, but juicy, sweet, and pleasant, with a very slight Muscat flavour. The seeds are large, but rarely more than one in each berry. The Vine sprang up by chance in the stove at Wortley Hall, and the specimens sent were its first produce. It is proposed to call it the *Wortley Hall Grape*.

Mr. Isaac Oldaker exhibited specimens of the *Poonah Grape*, a very handsome variety, the produce of a Vine received by the late Sir Joseph Banks from Sir Evan Nepean at Bombay. The bunch is large and well shouldered, tapering regularly to a point. The berries are slightly oval, dark red, where fully exposed to the sun, but pale where shaded, fleshy, with seldom more than two seeds in each, sweet, but

not very juicy. It is a late variety, and requires as high a temperature as the Muscat of Alexandria. The Vine is very healthy, making vigorous wood, and is a free bearer. The fruit keeps well for a considerable time after it is ripe. The Vine is believed to have been originally introduced from Persia, by the way of Surat, to Aurungabad, and from thence to Poonah, and its vicinity, where it is cultivated successfully; from Poonah the fruit is sent in its ripe state to Bombay and its dependencies. The character of this Grape having been mentioned to Sir Joseph Banks by Mr. Briscoe, measures were immediately taken for the purpose of introducing so valuable an addition to our gardens. Numerous attempts failed, notwithstanding Sir Evan Nepean, then Governor of Bombay, lent the most zealous assistance, by transmitting plants by almost every ship. At length, in 1817, a living plant was received, which, under the care of Mr. Oldaker, at Spring Grove, was well established, and is now in a full bearing state.

Walnuts.

George Beauchamp, Esq. sent to the Society specimens of the *Highflyer Walnut*, grown in the town of Thetford, a variety which appears to have been originally confined to the neighbourhood of that place, and of Bury St. Edmund's, and which has of late become very scarce, from the great number of Walnut trees felled during the late war for gun stocks. It is a long oval, with a shell so very thin that the slightest pressure of the fingers crushes it. The kernel is full, white, very tender and high flavoured. It is by far the best Walnut grown; attention ought consequently to be paid

to continue the kind by budding, on the plan recommended by the President in the *Transactions* of the Society,* for though varieties of Walnuts sometimes, and perhaps frequently, reproduce themselves, no certain reliance can be placed on the quality of seedlings. The specimens exhibited were produced from trees growing in a small garden at the back of the house of Mr. JACKSON, a grocer, in Thetford, and belonging to him.

PEARS.

Specimens of a *Pear*, resembling the Bishop's Thumb, were received from Mr. SAMUEL KNEVETT of Turnham Green, and Mr. JOHN WILMOT of Isleworth. The same Pear had been received in a former year from Mr. RICHARD WILLIAMS of Turnham Green. In that neighbourhood it is called *Knevett's Pear*, from the circumstance of a tree of the variety about fifty years old being in Mr. KNEVETT's Garden. It is very long, somewhat Fig-shaped; skin dull green, covered on the exposed side with brownish red, and sprinkled with minute brown spots. The flesh is white, firm, yet melting, very sweet with a pleasant bergamot perfume. It ripens towards the end of September, considerably before the Bishop's Thumb Pear. This is the same Pear as the Poire Figue or Poire Pistolette, specimens of which have been at different times received from Mr. STOFFELS, of Mechlin, in Flanders. The Flemish Poire Figue, however, is not the same as the Poire Figue of DUHAMEL and KNOOP, their variety being that which is called in England the Windsor Pear.

* Vol. iii. page 133.

The Marie Louise Pear.

Specimens of the *Marie Louise Pear* were received from Roger Wilbraham, Esq. the produce of a tree in his garden at Twickenham, trained to a south wall, which is, however, much shaded with trees; it is known to succeed equally well on an east wall. This Pear, which has already been noticed in the Society's *Transactions*,* has far exceeded the highest expectations which had been formed of it. Its general form is like that of the Saint Germain, but tapering less towards the stalk. The skin is of a greenish yellow, deepening where exposed to the sun, or when full ripe, to a rich yellow clouded with light brown russet. Stalk generally an inch and a half long, pale brown. Flesh inclining to yellow, perfectly melting, with abundance of sweet juice. The annexed figure, from a drawing by Mr. Charles John Robertson, will convey a very perfect idea of this excellent and beautiful Pear. In favourable situations, however, it attains to a much larger size, being sometimes five inches long, and three inches wide, and weighing eight ounces. Its period of maturity is from the middle of October to the middle of November, according to the place of its growth: those received from Mr. Wilbraham having ripened on the 17th of October, and some which were received from Mr. Knight, not till the 15th of November; but these last were produced in the climate of Downton, which is very inferior to that of Middlesex. This is one of the numerous seedlings which have been raised within a few years in the Netherlands. The first specimens received by the Society came from Dr. Van Mons when he resided at Brussels, and grafts and plants were obtained from his garden there, and subsequently from that of the Count

* Vol. ii. page 406, and Vol. iii. page 120.

Coloma at Mechlin through the hands of Mr. Stoffels. It is said to have been raised by the Abbé Duquesne, together with the Napoleon Pear, already described in the *Transactions*.*

John Braddick, Esq. sent specimens of the *Seckle Pear*, the produce of espalier trees in his garden at Thames Ditton. This fruit has already been described in the *Transactions* of the Society,† and a figure there given of it, from a drawing made in America, and received from Mr. Coxe of Burlington, New Jersey. It is gratifying to find that the present specimens, though larger, closely resemble the figure published with the account, and fully justify the high character given of the Pear by Dr. Hosack in the Paper alluded to. In shape it resembles the Swan's Egg, but is a little longer. Stalk from half an inch to an inch long; eye not sunk, but even with the head of the fruit; skin of a greenish olive colour, often washed with much dull or bronze red on the side exposed to the sun, and sometimes slightly streaked with lighter red; flesh yellow, very fine in texture, melting, juicy, and sweet, with a delicate and extremely powerful bergamot perfume; it is in this perfume that the character of the Seckle Pear differs from all others, and which has caused it to be so highly extolled in America. The period of its maturity appears to be later with us than in America, the fruit being in fine condition here at the end of October and beginning of November. The Society having received, by the kindness of Dr. Hosack, a number of plants of the Seckle Pear in the year 1819, distributed them to the nurserymen round London, then connected with the Society;

* See page 215 of this Volume. † Vol. iii. page 256.

Apples.

William Atkinson, Esq. exhibited specimens of the *Red Astrachan Apple*, the produce of a tree in his garden, imported from Sweden with that name. This is one of the very best of the early Apples. Its form, generally, is round, with somewhat indistinct angles on the sides. The eye is in a tolerably deep cavity, surrounded by a few knobby protuberances. The stalk is short, deeply inserted. The skin is green on the shaded side, becoming a greenish yellow when quite ripe; red on the exposed side, spotted with russet, and having a little coarse russet surrounding the stalk. The greater part of the surface is covered with a delicate whitish meal like the bloom of a plum, which, when the fruit is seen at a little distance, gives it much the appearance of a Peach. The flesh is white and crisp, with abundance of rich sugared acid juice. This Apple is very excellent before it becomes quite ripe, but turns woolly in a few days, and if suffered to hang long on the tree, is apt to split. The tree is very vigorous in habit, and an abundant bearer. The fruit ripens about the middle of August.

Mr. Atkinson at the same time sent specimens of the *Revelstone Pippin*, the produce of a tree received from Scotland. This is enumerated among the table Apples usually planted against walls in the gardens in the Carse of Gowrie.* In this country it does well as a standard, and is an abundant bearer. It is of the middle size, somewhat angular on the sides, the angular projections uniting round the eye in large knobs. Stalk short and thick, inserted in a very regular cavity. Skin

* Memoirs of the Caledonian Horticultural Society, Vol. i. page 327.

The Grimstein Apple.

Weber lith. 1821

greenish yellow, thickly sprinkled with yellowish russet spots, and nearly covered with bright red. Flesh yellow, firm, rather dry, but sweet, and of very good flavour. It will not keep well beyond the beginning of September.

Specimens of the *Gravenstein Apple* were also received from Mr. Atkinson, as well as from Mr. John Wilmot. It is said that the parent tree, probably raised accidentally from seed, existed in the middle of the last century in the garden of the Duke of Augustenberg, at Gravenstein, in Holstein. Hirschfeld, who first described the Apple, says its name is derived from Gravenstein, a ducal estate and castle in Sleswick. Others, Diel says,* assign it an Italian origin. The form of this fine Apple is generally round, somewhat flattened, rather angular on the sides: eye sunk in a deep cavity, surrounded by several projecting folds or knobs. Stalk very short, deeply inserted. Skin smooth, of a fine clear straw-colour, streaked with red where exposed to the sun. The flesh is of a pale yellow colour, not very fine in texture, juicy, and with a high vinous, sweet taste. It is a first-rate autumnal Apple, ripening in the end of October, but does not keep well beyond the end of November. Plants of it have been introduced from many parts of Germany and Sweden. It is highly esteemed in the whole of the north of Europe, and considered one of their best sorts. The annexed figure, by Mr. Hooker, from a specimen sent by Mr. Wilmot, will convey a very perfect idea of a fruit of the largest size.

* Diel, Versuch einer systematischen Beschreibung in Deutschland vorhandener Kernobstsorten, Vol. viii. page 8.

Mr. PATRICK FLANAGAN, gardener to Sir THOMAS HARE, at Stowe Hall, Norfolk, exhibited specimens of an Apple called by him the *Golden Noble*. It is of large size, round, becoming a little pointed towards the eye, which is small and not deeply sunk, surrounded by several small folds. Stalk quite short, and thickened, like that of the Kerry Pippin. Skin perfectly smooth, of a clear bright yellow colour, without any blush of red, but having a few small reddish spots, and generally two or three small round patches of russet. The flesh is yellow, tender, with a pleasant acid juice. It bakes of a fine clear amber colour, perfectly melting, with a rich acidity. It is a first-rate kitchen Apple. Mr. FLANAGAN obtained his plant from an old tree in a garden in the neighbourhood of Downham, where it is believed to be a seedling. It is of vigorous growth, healthy, and bears well.

HARRY DOBREE, Esq. sent to the Society specimens of a Seedling Apple, raised by the late CHARLES MOLLET, Esq. in his garden in the island of Guernsey. It sprang up from a seed of the Golden Pippin, but closely resembles the Golden Harvey. The flesh is yellow, crisp, juicy, and very high flavoured. It has been named *Mollett's Guernsey Pippin*, and is a superior Apple for the dessert.

The experience which has been obtained in this and two preceding seasons of the habit of the *Alexander Apple* tree renders some notice of it necessary, to correct what was said of it in a former part of the *Transactions*.* It is there conjectured that it might be necessary to train the plant to a wall, in some measure to compensate for the want of the

* See Vol. ii. page 407.

heat of a Russian summer. It is now found that, so far from wanting any assistance of this kind, it is perfectly hardy, bearing in great abundance as a standard. From the large size of the fruit, however, dwarfs or espaliers are to be preferred. The fruit, when gathered at the usual time, will keep well till Christmas, but it possesses the remarkable property of hanging on the tree till January, or perhaps even later, and in that state, continues firm and good. The leaves of the tree turn to a beautiful red in the autumn, and fall early, leaving the fruit on the bare branches, if not previously gathered. The trees, when young, grow strong and upright, but when older, their branches take more irregular directions.

Thomas Hunt, Esq. of Stratford-upon-Avon, sent specimens of an Apple, raised at Gloucester, by Dr. Fry of that town, from a seed of the Nonpareil, which has been named *Hunt's Duke of Gloucester*. It resembles a Nonpareil in form, but is a little more oval, the skin is a clear green on the shaded side, but little of that colour is visible, nearly the whole being covered with thin russet, becoming coarser and thicker round the eye; on the side exposed to the sun it is tinged with a reddish brown. The flesh is white, mixed with green, like the Nonpareil, crisp, juicy and high flavoured. The Apple is fit for the table in November, but keeps well till late in the spring. The colour of the bark strongly resembles that of the Nonpareil, but the wood, though similar, does not grow so strong. The blossoms are hardy, and the tree is a very good bearer.

Major General Le Couteur sent to the Society, from the Island of Jersey, specimens of the *Petit Jean Apple*, a variety which appears to be new to this country, though long culti-

vated in the common orchards of that island. It is oval in form, slightly flattened at both ends: the eye is very small, placed in a confined cavity; stalk very short, and deeply inserted; skin, where shaded from the sun, of a pale yellow, but the whole nearly covered with brilliant red, which in less exposed parts is broken into stripes, through which the ground colour is seen. The flesh is very white, extremely tender, with a mild and very agreeable juice. It keeps well till the end of the season, and is a very handsome and pleasant Apple for the dessert.

Thomas Netherton Parker, Esq. of Sweeney, in Shropshire, sent specimens of a Seedling Apple raised by him at that place in the year 1807, and which has in consequence been named the *Sweeney Nonpareil*. It is somewhat of the Nonpareil form, but more irregular, and considerably larger. The skin is green, with spots and patches of russet all over it; but it sometimes puts on the brilliant colour of a fine Nonpareil; in some seasons it exhibits an exuberance of juice in semi-pellucid patches, which occasionally rise above the regular surface of the Apple; some specimens are entirely covered with russet. The flesh is firm and crisp, with abundance of juice, in which a powerful acid is combined with much sugar. The combination of these qualities in an unusual degree of strength, occasions much difference of opinion in estimating the value of this variety, but all agree as to its excellence for culinary purposes; as it melts perfectly when baked, and retains a fine flavour. The tree puts forth its blossoms early; the wood, leaves, and blossoms are nearly the same as those of the Nonpareil. The fruit is fit

for gathering about the middle of November, or earlier, and some of it may be kept till late in the spring; but when kept very long, it gradually becomes shrivelled, and parts with its acid flavour, as it loses its crispness; yet it retains its sweetness, even when the flesh has assumed a tough and spongy character. From what has been observed of the austere sharpness of the flavour of this Apple in autumn, and of its vapid sweetness in spring, it may be inferred, that there is an intermediate period in which it may be ranked as an acceptable variety for the dessert. The tree is an abundant bearer, and has sometimes produced fruit of eight ounces weight, and ten inches in circumference. The produce of the parent tree in the last season (1821) was in number 403, and in weight 105lbs.; a score of the Apples of this crop, weighing 7lbs. 13 ounces, has been received by the Society, the two largest measuring $10\frac{1}{4}$ inches each in circumference, and weighing $7\frac{1}{2}$ ounces each. The whole crop of the year 1821 (a bad season for fruits) has more of the russet colour than usual, and at present (middle of December) the acid flavour is very predominant: no semi-pellucid patch is observed upon any of this crop, which is nevertheless considered, both in quantity and size, as a very fair sample of the variety. The largest Apple ever grown of this sort was produced in the year 1818, measuring $11\frac{1}{4}$ inches in circumference, and weighing $9\frac{1}{4}$ ounces. The produce of this variety has been hitherto too limited for any trial of its value as a Cider Apple. It is probable, that it would be much improved in flavour by being transplanted into a warmer climate than the northern part of Shropshire.

Mr. John Slade, gardener to the Earl of Egremont, at Petworth, sent specimens of a very handsome large Apple called by him the *Bossom Apple*, which was not previously known to the Society. In shape it is obtusely pyramidal; the eye is placed in a shallow cavity surrounded by several rather indistinct folds, the stalk is about an inch long, deeply inserted; skin pale greenish yellow, very much russetted, and in some specimens with bright red on the side exposed to the sun. The flesh is of a dull white, inclining to yellow, fine in texture, crisp, with a rich sugared juice. It bakes of a fine colour, melts perfectly, and keeping well, is a useful Apple. The tree grows to a large size, with wide spreading branches, and bears abundantly.

William Baker, Esq. sent from his garden at Bayfordbury, in Hertfordshire, specimens of a small excellent Dessert Apple, of the size and character of the Golden Pippin, but rather flatter. The skin is partly a golden yellow, and partly brown, shaded into each other, the best ripened specimens being studded with small, smooth excrescences. The tree from which Mr. Baker obtained his grafts is a very old one, in an orchard at Hertingfordbury, the adjoining parish to Bayford. Mr. Baker had met with this Apple in the London market, under the name of the Bayford Pippin, before he was aware of its existence in his own neighbourhood, nor is he certain that the name was derived from Bayford, in Hertfordshire; the circumstance, however, of several old trees of the variety being found in that and the adjoining parishes, leaves little doubt of its having originated there. It has been named by the Society the *Bayfordbury Pippin*.

Mr. Richard Williams, sent from his garden at Turnham Green, specimens of an Apple called the *Wellington*, a very handsome and long keeping variety. It is rather above the middle size, round, flattened at both ends. Eye large and open, rather deeply sunk; stalk very short, skin clear yellow, with a blush of bright red where exposed; the whole surface thinly sprinkled with small brown spots. Flesh yellow, crisp, with a brisk acid juice. It is an excellent sort for culinary purposes. This Apple affords another instance of the impropriety of giving new names to fruits already named. It was raised some years ago by a Mr. Dumelow, a farmer near Ashby-de-la-Zouch, and is now well know in Leicestershire, Derbyshire, and Nottinghamshire, under the name of *Dumelow's Crab.* Mr. Williams received it from Gopsal Hall, which is in the neighbourhood of Ashby-de-la-Zouch, under the name of the Wellington, and under this name it is now becoming common in the nurseries round London. There can be no doubt as to the propriety of restoring its original name, by which it is so extensively known in the neighbourhood where it was first produced.

Mr. John Slade, gardener to the Earl of Egremont, at Petworth, exhibited specimens of the *Royal Reinette*, an Apple grown in the western parts of Sussex. It is a little more conical than the Golden Reinette. The eye is large, and open, in an even but small cavity; stalk very short, with the flesh growing pretty close round it; skin delicate yellow, with stripes and staining of brilliant red on the exposed side, sprinkled with a few small spots, which appear dark on the yellow part, but gray on the red; the whole surface highly polished and shining. This is an Apple of unusual beauty,

of good flavor, and keeps well till April and May. The tree is healthy, and a free bearer.

Mr. James Carrel, nurseryman at Pinner, exhibited specimens of a Seedling Apple, raised in his nursery, which has been named the *Pinner Seedling*. It is of the middle size, slightly angular on the sides, eye close, very little depressed; stalk short, in a confined but deep cavity: skin bright yellow, but nearly covered with clear yellowish russet; flesh inclining to yellow, crisp, and tender, with a fine brisk sugared juice. The tree is ten years old, and bore its first crop in 1818. The wood is of a beautiful dark mahogany colour, very free in its growth; the blossom is of a fine Peach colour, not unlike that of the Golden Pippin. The fruit keeps well till the end of May, and is good even later.

LXXXII. *On* Forcing Plums. *In a Letter to the Secretary.*

By John Townsend Aiton, *Esq. F. H. S.*

Read September 18th, 1821.

Sir,

In compliance with the desire expressed in your Letter, respecting the early *forcing of Plums* in the Royal Gardens at Cumberland Lodge, I beg to offer the following brief observations.

The kinds of Plums generally preferred for forcing are the following, Précoce de Tours, Green Gage, Blue Gage, White Perdrigon, Orleans, New Orleans, and Morocco. Some others have been tried, as la Royale, Simiana, and Blue Perdrigon, but are found objectionable, the two first producing fruit void of flavour, and the latter has a tendency to crack and gum.

When an early crop is desired, Plums are best forced in large pots or tubs, as this method admits of their removal at pleasure into different degrees of temperature, as occasion may require; but for a general crop to ripen by the end of May, or beginning of June, it is preferable to have the trees planted in the forcing-house, and if they are intended to be forced in the first year, proper trees for the purpose, furnished with well branching wood, should be selected and planted early in the autumn, that they may establish themselves before the winter sets in. The soil to be preferred is a moderately rich loam, without mixture of manure.

For a crop to ripen in the second week in May the house must be covered in early in January, commencing with a temperature of 42° of FAHRENHEIT, for the first fortnight, after which the heat may be gradually raised to 52°, at which it may continue until the flowers make their appearance; during this time frequent changes of air must be admitted, to strengthen the bloom, and the crop will be rendered more certain by keeping the trees in blossom as long as possible, by light shading, when necessary; and when the petals begin to fall, gentle dews may be raised from the surface of the mould.

As the fruit forms, the thermometer should be raised to 58°; this must be done gradually, as the consequence of a rapid rise may be a casting of the fruit; during the progress of stoning great care must be taken against sudden variations of the temperature, water very sparingly used, and every check by fumigation, &c. given to the various insects which will be particularly active at this period. When the fruit is safely stoned, a moderate dressing of rotten manure may be spread on the surface of the mould; the heat increased to 68°, and a more liberal supply of water given. After the fruit has attained a full size, and approaches maturity, air may be freely admitted, and water should be given in less quantities, and finally discontinued, a few days before gathering.

I remain, Sir,

Your very obedient humble servant,

JOHN TOWNSEND AITON.

Royal Gardens, Windsor,
3rd September, 1821.

LXXXIII. *Notice of a* Pit *for fruiting* Pines *and* Melons, *with Observations on the* Production of Seeds of Pine Apples. *In a Letter to the Secretary. By* Mr. William Buck, *Corresponding Member of the Horticultural Society; Gardener to the Honourable* Fulk Greville Howard, *F. H. S. &c. at Elford, near Lichfield.*

Read June 5, 1821.

Sir,

I submit to the consideration of the Fellows of the Horticultural Society a *plan of a Pit*, which I erected for a gentleman in this neighbourhood in the year 1815. My brother, who lives with Lord Bagot at Blithfield, in this county, afterwards built one forty feet long, on a similar plan, and these are all that have as yet been constructed on the same principle. They are found to answer admirably for Pines, so much so, that this fruit forms and matures its seeds in them more perfectly than in any other pit or stove with which I am acquainted.

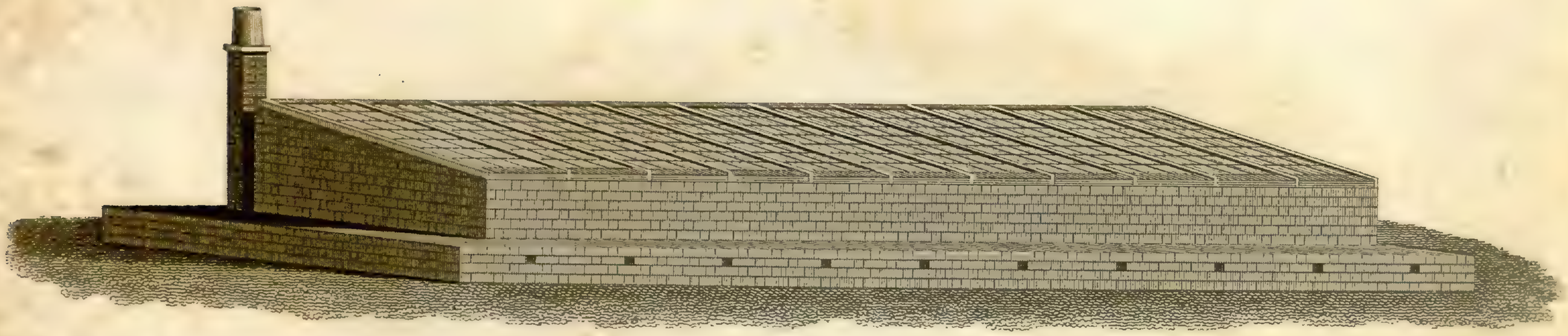
When the pit is used for Pines, the warm air is admitted amongst the plants through the checquered brick-work from the air flues which surround the fire flue. When Melons are to be grown, the pit is necessarily filled so as to cover the checquered brick-work; when this is done, care must be taken to cover the openings, into the air flues, so as to prevent their being filled with the mould or dung; and when a crop

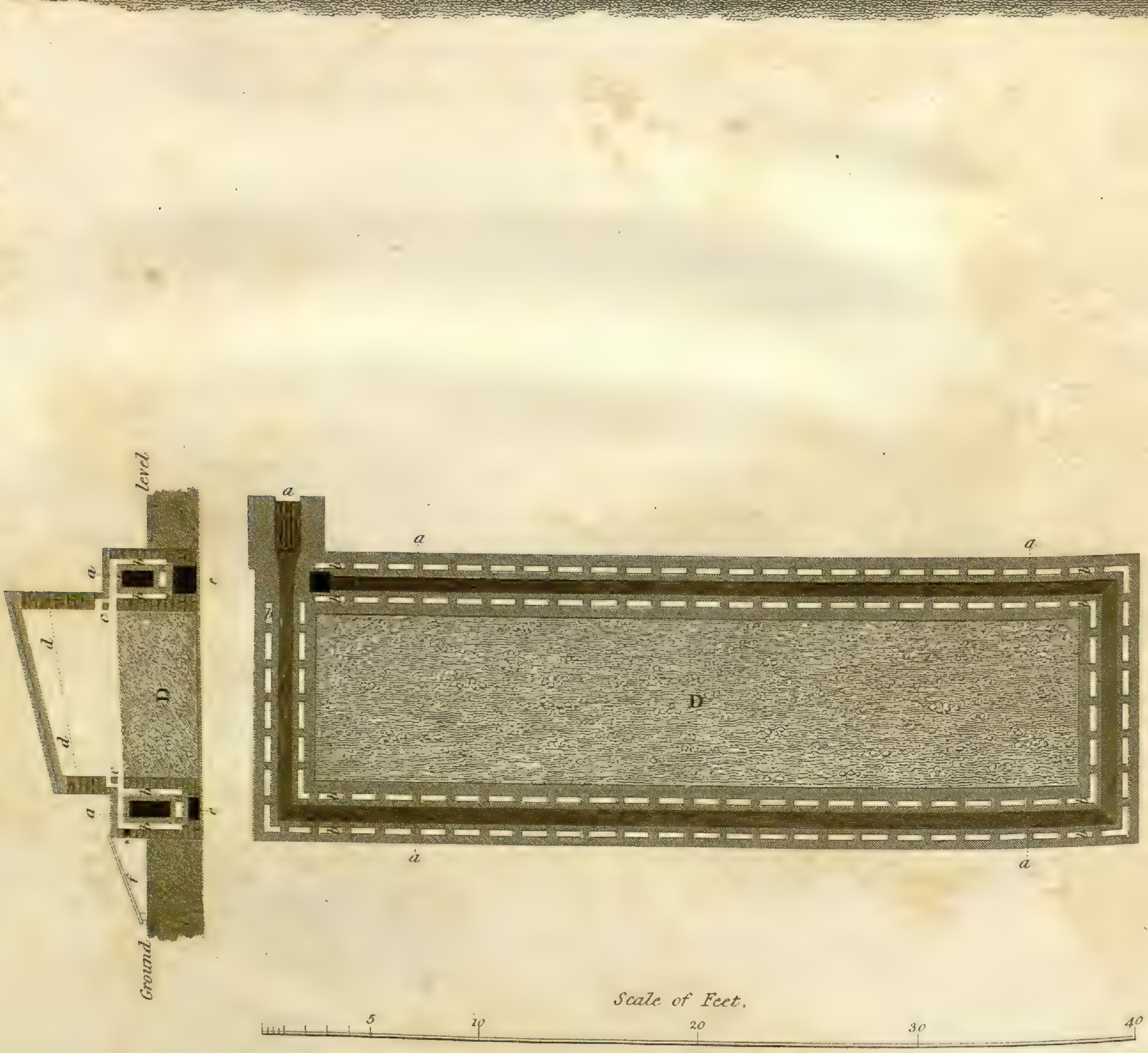
of Melons is to be grown, I recommend that some hollow draining or ridge tiles be placed against the holes in the brick-work, and carried across the bed horizontally from one side to the other, at several places, forming hollow spaces, so that when the warmth of the dung declines, the heat produced by means of fire in the flue may be rapidly carried through the pit. I also advise, that some tiles be placed perpendicularly against the sides, from the holes to the surface of the earth, to let the warm air of the flues amongst the Melon plants, in cold weather: the openings of the tiles at top may be uncovered, or stopped at pleasure by flat tiles or slates.

When Pines have been grown in the pit, the filling of it has been effected in different ways. Sometimes horse-dung has been used, with tan on the top, into which the pots are to be plunged, and which will keep the steam of the dung from injuring the plants: at other times the pit has been filled with oak leaves, and a small portion of tan: and leaves mixed with dung, having tan on the top; and tan alone has also been used. I have found all these methods succeed very well. For Melons, dung alone has been applied, either put fresh in, or raised upon what has been left after the Pines have fruited, or after Asparagus has been forced during the winter, and early spring months; a use to which the pit has occasionally been applied after the Pines have all been cut.

I have mentioned above the production of the *Seeds of Pine Apples*, which is not a very usual occurrence: they are generally obtained from those Pines which blossom in

Plan of a Pit for fruiting Pines and Melons.





August, and ripen their fruit about December. I have seldom known seed produced at any other time of the year; but I have seen, in one or two instances, several hundred seeds from one fruit at that season.

I remain, Sir,

Your most obedient humble servant,

WILLIAM BUCK.

Elford, near Lichfield,
May 26th, 1821.

REFERENCES TO THE PLATE.

a. a. Fire place and flue, passing round, on the outside of the wall of the pit.

N. B. The smoke may be discharged by a chimney, raised above the fire place, as represented in the plate, but if the fire place is kept low in the ground, the smoke may be conveyed from the end of the flue under ground to a chimney in some contiguous wall or building.

b. b. Air flues round the fire flue, which must be tied by bricks, at intervals, to the walls on both sides, to strengthen the whole fabric.

c. c. Two courses of checquered brick work round the pit, in the manner of the air-holes in barns, to admit the heated air into the pit.

D. D. The pit for the Pine plants, filled up to the bottom level of the checquered brick-work. When Melons are to be grown in the pit, the mould above the

dung is raised to the height of the line *d d* or about twelve inches in front, and eighteen inches at the back, from the glass, or higher, if thought necessary.

e. e. Hollow places under the flue, left open, for drains, but if they are not required, the spaces may be filled up.

f. Temporary glass or paper lights, to preserve late Cauliflowers, Lettuces, or Endive, or to raise early Potatoes, Radishes, &c. under. By leaving holes in the outside wall of the air flue, where marked, along its whole length, heat may be supplied to this covered border as required ; the whole, or part of the holes, may be stopped with moss, if necessary,

* Holes in the outside wall of the flue.

LXXXIV. *Account of the* Cultivation *of the* Water Cress, *as practised by Mr.* William Bradbery, *at West Hyde, near Rickmansworth, in Hertfordshire. In a Letter to the Secretary. By* Henry Bellenden Ker, *Esq. F.R.S.&c.*

Read November 6, 1821.

Dear Sir,

I lately found that the *Water Cress* is grown in this neighbourhood by Mr. Bradbery for the purpose of supplying the London markets, and as I believe no account of the mode of culture has been yet published, I have made enquiries of Mr. Bradbery, who, with the greatest willingness, furnished me with the information which I now send to you.

Mr. Bradbery first began to cultivate the Water Cress in February, 1808, at Northfleet-Spring head, near Gravesend; for this purpose, he procured young plants, and placed them, with a small proportion of the wet earth in which they grew, in shallow running water; the plants soon formed large tufts, and rapidly spread over the water; and he gathered the Cress regularly for the London markets.

Mr. Bradbery conceives that there are three sorts of this vegetable; the first he calls the *Green-leaved*, the second the *Small Brown-leaved*, and the third the *Large Brown-leaved*. The three sorts he considers to be the same in taste, although the large brown-leaved sort is, from its appearance, preferred

in the market, and indeed, I should suppose also from there being a lesser proportion of stalk to the leaf. They are varieties of the same species, (*Nasturtium officinale*,*) but they are not noticed as such in the *Hortus Kewensis*, or in any other botanical work†; their difference does not appear to arise from the variation of the quality or quantity of the water in which the plants are found, for the three may be seen growing together, though Mr. Bradbery states that some are more fitted than others for particular waters, the *Green-leaved* is easiest of cultivation, and the *Small Brown-leaved* is the hardiest; the *Large Brown-leaved* is the only sort he cultivates; it is the only one which can be well grown in situations where shallow water is not to be obtained.

It was soon perceived that the plants grew better, and had a superior flavour, when disposed in rows parallel with the course of the stream, than when left in irregular patches. When in rows, the plants are more regularly exposed to the influence of the current, and the water is not so much impeded in its course, because there are regular open channels between the rows. The Cress is also more easily gathered from the rows, and more readily freed from weeds, and the different matters which pass down the stream and become entangled with the plants.

Mr. Bradbery having left Northfleet last year, began to

* Hortus Kewensis, Vol. iv. page 110.—*Sisymbrium Nasturtium.* Willdenow, Species Plantarum, Vol. iii. page 489 —English Botany, plate 855.

† In Ray's Synopsis of British Plants, 3rd edition, page 301, a variety is mentioned, which blossoms earlier and has smaller leaves.

plant, at a considerable expense, beds of the Cress at West Hyde, near Rickmansworth. It was found necessary to vary the spaces between the rows, according to the depth of the water. When it is deep the rows are five, six, and even seven feet apart, whilst in shallow waters, about eighteen inches space between the rows is considered as sufficient. The plants are found to thrive best in shallow water; that is, when the depth is about an inch and a half, which encreases when the plants begin to grow, and thereby to check the current, to about three inches. In deep water the roots are easily drawn out of the soil, which makes it difficult to gather the vegetable freed from the roots: if, therefore, a sufficient space covered with shallow water could be obtained, the deep water would not in any case be used.

The shoots are cut for market, not broken off, which is the usual mode of gathering the wild Cress, and which latter practice is found to be very injurious to the plants in the beds. After frequent cutting, the heads are found to grow small.

The most expensive part of the cultivation is the necessity of clearing out and replanting the beds twice a year; as the mud quickly collects about the roots, and the duck weed and other plants become intermixed with, and choak up the Cress, it is almost impossible to pick it in a fit state for market after the plantation has been made five or six months.

The mode of replanting is to remove all the rows of plants, beginning at the stream-head, and then clear the bed of the stream from mud and rubbish, which, however, it should be

remarked, make excellent garden manure. From the mass of plants thus taken out, the youngest, and those with most roots, are selected ; these are placed on the gravel in rows at the requisite distances, with a stone on each plant, to keep it in its place. The Cress will not grow freely in a muddy bottom, nor will they taste well when there is mud about the roots, which should be carefully removed, and replaced by gravel or chalk. It is absolutely necessary to have a constant current, as when there is any obstruction to the stream or flow of water, the plants cease to thrive. The times of renewing the beds are in May and June, and from September to November. The planting is done in succession, so that the crops may come regularly into cutting. Those planted in May are fit to cut in August, and those planted in November are ready to gather in the spring.

After the plants have been cut about three times, they begin to stock, and then the oftener they are cut the better : in summer it is necessary to keep them very closely cut ; and in water of a proper depth, and with a good soil, each bed supplies a gathering once a week. In winter the water should be rather deeper than in summer (four or five inches) ; to obtain this, the plants are left with more head, that the water may thus be impeded. Mr. Bradbery has about five acres planted. He sends the Cress in hampers, each containing eight dozen bunches, to the London markets every day throughout the year, except Sundays ; three days in each week to Covent Garden market, and the other three days to Newgate market.

The water in Mr. Bradbery's Cress plantations is

produced from springs which rise in the swampy meadows bordering on the river Colne, and which have their sources not far distant from the spot he cultivates ; it is essential that the plantations should be made in fresh or newly-risen spring water, as the plants not only thrive better in it, but in consequence of its being rarely frozen, they generally continue in vegetation, and in good state for gathering through the whole winter season. The large space under cultivation at West Hyde has been gained by cutting away the banks of the streams, and thus widening the courses which were originally narrow ; in the beds of water thus artificially formed a uniform depth is preserved, and the whole bottom is covered with clear gravel.

This cultivation of the Water Cress has insured a constant and regular supply to the metropolis, and the gatherings are received much fresher and more regularly packed than those obtained from plants in the wild state, where little selection is made, as to the quality, or attention paid to the state of the vegetable, which is usually sent up to town in sacks, and often much bruised and broken before it reaches the retail dealer.

It should be added, that since the cultivated Water Cress has been sent to market, the wholesale price is reduced one half; Mr. Bradbery is not aware that any one cultivated the Water Cress prior to the time he first planted it at Northfleet.

I learn that there are two small establishments for the cultivation of the Water Cress in the neighbourhood of Hackney, the produce of which is taken to the Spitalfields market ; one of

them, which is at Hommerton, was formed about three years since; the other, which is at Hackney Wick, has only lately been planted.

I am,

your very faithful Servant,

HENRY BELLENDEN KER.

Rickmansworth,
14*th October*, 1821.

LXXXV. *On the Cultivation of the* Pine Apple. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read November 6, 1821.

Writers, who have recommended new modes of practice upon the authority of their own observation, and experience, have generally been accused, and often with sufficient reason, of condemning every thing, which had previously been done, as wrong, and absurd; and of asserting their own practice alone, to be reasonable and right. I fear that in the opinions, which I have given, and which I proceed to give, relative to the *Culture of the Pine Apple*, I shall incur the risk of subjecting myself to similar charges. But I beg it to be understood, that I condemn the machinery only, which our gardeners employ; and that I admit most fully their skill in the application of that machinery to be very superior to that which I myself possess. Nor do I mean, in the slightest degree to censure them for not having invented better machinery; for it is their duty to put in practice that which they have learned; and, having to expend the capital of others, they ought to be cautious in trying expensive experiments, of which the result must necessarily be uncertain; and I believe a very able, and experienced gardener, after having been the inventor of the most perfect machinery, might, in very many instances, have lost both his character and his place, before he had made himself sufficiently acquainted

with it, and consequently become able to regulate its powers. I still feel that I have much to learn in the management of my machinery, though I possess more than sufficient evidence to enable me to assert with confidence, that, in the culture of the Pine Apple, the bark-bed, or other hot-bed, if the plants be plunged into it, is worse than useless, after the scions, or crowns, have emitted roots; and that the Pine Apple, when treated in the manner I have recommended, is a fruit of most extremely easy culture.

It is contended, in favour of the bark-bed, that the soil in inter-tropical climates is warm, and that the bark-bed does no more than nature does in the native climate of the Pine Apple.* And if the bark-bed could be made to give a steady temperature of about ten degrees below that of the day temperature of the air in the stove, I readily admit that Pine plants would thrive better in a compost of that temperature, than in a colder. But the temperature of the bark-bed is constantly subject to excess, and defect, and I contend, and can prove, that the above-mentioned temperature is very nearly given in my stove. For the temperature of the day being about 90° or 95°, and that of the night 70°, the mould in the pots will necessarily acquire nearly the intermediate temperature of 80°. It is true, that two disturbing causes are in action; the evaporation from the mould, and porous surface of the pots, and the radiant heat of the sun. But these causes operate in opposition to each other, and probably nearly negative the operation of each other, as far as respects the temperature of the mould in the pots.

* See Mean's edition of Abercrombie's Practical Gardener, page 609.

A very great number of gardeners have within the last twelve months visited my garden. Some of these were at once convinced of the advantages of the mode of culture which they saw; others have paid a second, or third visit; but every one has ultimately declared himself a zealous convert. I have never yet seen plants of the same age equally strong, nor any producing fruit better, nor indeed so well swelled; nor any equal in richness and flavour. But I have never taken off, nor shortened a root, nor taken any other measures to retard the period of fructification, with the prospect of obtaining larger fruit; and my plants have almost always shewed fruit when fourteen or fifteen months old, though propagated from small and young suckes, or crowns. A great part of my Queen Pines (I have hitherto scarcely ever cultivated any other varieties) have, however, at that age, shewn fruit with eight, and some with nine rows of pips; and I often see fruit of less weight growing upon plants of nearly double that age. Whether I shall be able to retard the period of fructification, or not, I have yet to learn; but I believe, I shall succeed by crowding my plants close together, so that each may receive less light.

I have tried a variety of composts; and of these I have found that which I have described in a communication relative to the culture of the Cockscomb,* to be the most stimulative of growth. Pine plants will, however, grow perfectly well in composts of different kinds; but I have found that they have succeeded best when the materials have been fresh,

* See page 321 of this Volume.

and retaining their organic form, particularly if the pots be large, relatively to the size of the plants, which, I think, they always ought to be, for the mode of culture recommended. I have used, with advantage, the haulm of beans cut into lengths of about an inch.

Very contrary to the conclusions which I should have been led to draw from writings upon the culture of the Pine Apple, I have constantly found that my plants succeed best in the part of my house where the flue first enters, and where the temperature is very high, varying from about 85° to 105°, and the air excessively dry. I have pointed out this circumstance to every gardener, whom I have seen in my house, and all have expressed their astonishment at the circumstance. I expected that this excess of heat would have occasioned the plants to shew fruit prematurely, but this has not occurred in a single instance. What would be the quality of the fruit, if it were to be ripened in so high a temperature, I have not yet had an opportunity of knowing.

In raising young plants, I have deviated from the ordinary mode of practice by breaking off the suckers when very young; that is, when they are not more than four, or five inches long. The fruit is much benefited by their absence; and the cuttings, if placed very close together in a hot-bed, are made to emit roots with little trouble, and afford better plants than they do when they are suffered to remain long upon the parent stem. When the whole are removed at an early period, one or more very strong suckers usually spring out below the level of the soil; and from these, suffering only one to remain attached to the parent stem, and preserving

the roots as entire as possible, I have propagated with much advantage, and have obtained plants which shewed fruit strongly at seven months, dating from the period at which the sucker appeared, like a strong head of Asparagus, at the surface of the soil.

The success of my experiments, in the first house which I erected, (and to which the foregoing account exclusively refers) led me to erect another house in the summer of 1820. In this I attempted to obtain the greatest possible influence of light, and command of solar heat; inferring, from having observed Pine Apples to ripen tolerably well with very little light, that I should be able to ripen them in perfection late in the autumn, and early in the spring, particularly at the latter period, in which, alone, I set a very high value upon the species of fruit. The height of the back wall of this house is eight feet six inches, and that of the front wall is one foot six inches, and its breadth ten feet, inside measure, with an iron curviliar roof, of the kind of bar invented by Mr. LOUDON, of Bayswater. This house is fifty feet long, and capable of containing two hundred fruiting Pine plants. The curvature of the roof rises just one foot in twelve. The glass is laid in a composition of two parts white lead, with oil, and three of flint sand, and the overlaps of the glass are closely filled with the same material.* It is, consequently, very nearly air-tight; and no means are given for the air to

* This material appears admirably calculated to fill the overlaps in all cases, but its excessive hardness, and firm adhesion, must preclude the use of it, except to fill the overlaps, when the bars are made of wood.

enter, or escape, except by apertures immediately under the copings of the front and back wall, which can be efficiently closed at any time. It is, consequently, an instrument of very great power, and requiring, of course, much attention to ventilation: of which I had rather a lamentable proof in the last spring, when my plants were all burned, and spoiled in a few hours; the person who had the care of them having left them in a bright day closely shut up. The fault was not, however, in any degree in the house, for the plants were, previously, much the strongest, and the best I ever saw; and I believe, they would have afforded most beautiful fruit. I furnished the house again with plants as expeditiously as I could, chiefly in July; and I have since kept the temperature of it nearly between 70° and 95°, with a wish to make the plants shew fruit and blossom in the present month (October). In this, I have in part succeeded, though many of my plants have flowered a fortnight or three weeks sooner than I wished. The fruit is swelling well, and, I believe, will receive sufficient light through the winter to enable it to ripen in much perfection. The excellence of a few Pine Apples, which ripened in this house in the last winter, leads me almost to doubt whether the fruit in it will not ripen better, early in the spring, than in the middle of the summer, for I have observed that this species of plant, though extremely patient of high temperature, is not, by any means, so patient of the action of very continued bright light, as many other plants: and much less so than the Fig and Orange tree: possibly, having been formed by nature for inter-tropical climates, its powers of life may become fatigued, and exhausted by the length of a

bright English summer's day, in high temperature. Being a plant of low stature, nature has also probably given it the power to ripen its fruit, and seed, in the shade of other plants, in its native climate; and I discovered in the last summer, that it possesses the power to ripen its fruit perfectly in a lower temperature than I previously thought it capable of growing in.

In the month of June, I gave a couple of Pine plants, which had shewn fruit at six months old, and were of small size, and no value, to a child of one of my friends, to be placed in a conservatory, in which no fires were kept during the summer. In July, a storm of hail destroyed nearly, or fully, half the glass of the conservatory; and its temperature, through the summer and autumn, had been so low, that the Chasselas grapes in it were not ripe in the second week in September. In the second week of the present month (October) one of the Pine Apples became ripe, having previously swollen to a most extraordinary size, comparatively with the size of the plant; and upon measuring accurately the comparative width of the fruit, and of the stem, I found the width of the fruit to exceed that of the stem in the proportion of seven and three-quarters to one. The fruit had, of course, been propped during all the latter part of the summer, the stem being wholly incapable of supporting it. The taste and flavour of this fruit were excellent, and the appearance of the other, which is not yet ripe, and is of a larger size, is still more promising. I purpose to profit by this result in the next summer; and I hope to be able to communicate some further information to the Society in the autumn. I feel perfectly

confident, that if the roots of these plants had grown in a hot-bed of any kind, their sap would have been impelled into other channels; and that their fruit would not have attained, in any degree, the state of perfection which I have described.

LXXXVI. *Notice relative to the* Flowering *of* Lilium Japonicum. *In a Letter to the Secretary. By Mr.* Samuel Brookes, *F. L. S. & H. S.*

Read August 7th, 1821.

Dear Sir,

I herewith send you my best specimen remaining of *Lilium Japonicum*, which, I am sorry to say, has suffered much from the wind and rain since you saw it; if the plant had not been in such an exposed situation, the colour of the flower would have been pure white, with a broad streak of purple on the midrib of the external petals,* with which character it bloomed last year with me, in great beauty, though not in such vigour as at present. The bulb which produced the present flower-stem was planted in the spring of 1820, in a brick pit, used for the growth of Moutans, and at that time it was about the size of a small Nonpareil Apple, being indiscriminately taken from a large number imported the year before from China, by myself and my late partner, in the Lady Melville, Indiaman. The height of the flowering stems, of which it threw up five, was full five feet; four of the stems have produced three flowers on each, as large as those now sent, in which the length of the petals is about six inches, and the expansion of the flower about seven inches; the re-

* A drawing of the specimen sent by Mr. Brookes has been made for the collection of the Society by Miss Cotton.

maining stem produced but one flower. The compost in which the bulb was planted is an equal portion of Wimbledon bog mould and strong loam, and until the top of the plant reached the glass it was occasionally covered by the light of the frame.

Lilium Japonicum appears to be sufficiently hardy to endure our winters, as I have had a bed of them in the open ground two years without protection; the leaves and stems were, however, much injured by the wind and rain, while growing, and none attained a height exceeding fifteen inches. I am therefore of opinion that if treated as a hardy plant, it should be grown in a situation well protected by trees and shrubs, and not in the front of the flower border. Like most of its congeners, it delights in shade, and is well adapted to ornament thick and close shrubberies where other herbaceous plants do not thrive; it is easily propagated by separating the scales of the bulbs, each of which in time will become a good plant; it forms also small bulbs on the stem, below, the surface of the ground, so that it will not be long, I hope, before this truly magnificent plant becomes one of the chief ornaments of the garden.

Our knowledge of the species, as a native of Japan, was derived first from KÆMPFER,* and afterwards from THUNBERG.† The former adds the Japanese name of Sazuri to his description, but, from his account, as well as from that of the latter writer, it appears to produce only one flower on a stem in its native country The Chinese probably received their plants from the Javanese. In China the plant is es-

* Amœnitates Exoticæ, page 871. † Flora Japonica, page 133.

teemed for the beauty of its flowers, as well as for some medicinal qualities in its roots.

Among the Chinese drawings in the collection of the East India Company, is a tolerable representation of the Lilium Japonicum,* under the Chinese appellation of Pa-kup; when this was sent to Europe the note which accompanied it described the plant as differing but little from Lilium Candidum, and it consequently attracted less notice. In 1804, living bulbs, imported from China, in the Henry Addington Indiaman, were sent to Kew Gardens, where one blossomed in July 1813, and a drawing of it was made by Mr. SYDENHAM EDWARDS; this drawing was engraved for the *Botanical Magazine*,† and published, with a description of the plant, by Mr. GAWLER, (now Mr. BELLENDEN KER) in the same year. All the plants derived from this importation subsequently perished, but the large supplies obtained by us in 1819, as well as a successful importation by the Horticultural Society in the same year, have now removed all apprehension of a similar calamity, more especially as they have been extensively distributed.

Messrs. LODDIGES have recently published a figure of the Lilium Japonicum in their *Botanical Cabinet*, plate 438.

I remain, dear Sir,

Your very obliged Servant,

SAMUEL BROOKES.

Ball's Pond, August 2, 1821.

* Drawing, No. 94. † Plate, 1591.

Note by the Secretary.

Mr. Griffin of South Lambeth, whose superior skill in the cultivation of bulbous plants is well known, has been in the practice of keeping the Lilium Japonicum in pots, protected by a Green-house or a Garden frame; but he thinks they thrive best in the former. As it is desirable that every method of successfully treating this beautiful plant should be known, as well as because every possessor of the Lily may not have a brick pit, similar to that used by Mr. Brookes, the following account of Mr. Griffin's plan has been added.

He places the bulb in twenty-four sized pots, not lower than an inch from the surface of the mould, which is composed of about two thirds peat and one-third loam, the bottom of the pot being covered to the depth of two inches with broken pieces of tile, and the rough siftings of peat. The plants are kept entirely from frost, and are watered very little when in a dormant state, for they are then very impatient of wet in excess. The pots kept in the green-house are placed at a distance from the flues to prevent the mould drying quickly.

Mr. Griffin's stock of Lilium Japonicum is derived from bulbs which he received from China some years ago.

LXXXVII. *Notices of* Communications *to the Horticultural Society, between August* 1*st*, 1820, *and May* 1*st*, 1821, *of which separate Accounts have not been published in its Transactions. Extracted from the Minute Books and Papers of the Society.*

August 1, 1820. Mr. Walter Hogg, Gardener to John Edwards, Esq. at Rheola, in Glamorganshire, communicated to the Meeting this day *an account of his mode of treating some Pine Apple plants which had grown to unusual size.* In March 1820, he had several of different sorts, which had been suckers taken from the parent plants in 1816, and which, under the usual treatment, had become too large to receive proper sustenance while remaining in pots. To provide a fit place for them, he cut a deep trench along the back of the bark bed, into which he put a quantity of good earth, and then turned the pines out of the pots into it, and filled up round the balls with mould of the same quality, which he covered lightly with tan. At the time a few only of the plants were shewing fruit, but they all (with the exception of one plant of the New Providence) fruited immediately, and extremely well, yielding fruit from 3lb. to $5\frac{3}{4}$lb. each in weight. The plant of the New Providence continued growing luxuriantly till the following February, when it shewed fruit, which was cut in June, and weighed 9lb. 4oz. It was sent to the Society for inspection, and afterwards presented, by Mr. Edwards, to His Majesty.

During the growth of this Pine, it was twice nourished by a supply of fresh earth to its roots.

August 1, 1820. A plant in flower of the *Dwarf Carnation*, from the garden of the Society, was exhibited at this meeting. The singularity of the plant is, that its blossom is quite sessile, being embedded among the leaves close to the root, and not elevated on a scape or stalk, as is usual. The flower was of moderate size, and striped red and white. We are indebted to Lady Whitshed for the introduction of this curious variety; she brought it to England from Leige, and gave a young plant to Sir Joseph Banks, and another to the garden of the Society. It is difficult to propagate, as the few shoots which it makes are too short for layers, and only capable of being taken off for cuttings, and it does not produce seeds. The original imported plant, now in Lady Whitshed's possession, bears different coloured flowers, some are white, some red and white, and others Bizarres; sometimes they grow in bunches, entirely white, at other times the different coloured flowers are mixed. The bunches usually consist of five flowers, one in the centre, and four round it. The Dwarf Carnation is known to have existed many years at Leige, but it was the property of a person who would not part with it, or give a piping of it to any one. At his death there were two plants in his garden, one was obtained by Lady Whitshed, and the other fell into the hands of a gardener, who was not able to propagate from it. Lady Whitshed has been more fortunate in the management of her plant, and has obtained a few young plants from it.

SEPTEMBER 19, 1820. Mr. HEMPEL, of Altenburg, in Saxony, having presented to the Society the second edition of his *Magic Ring of Pomona*, Dr. NOEHDEN this day communicated a short view of what he conceived to be important in this new publication. The subject having, since the appearance of the first edition, and the notice taken of it, in the Society's *Transactions*, engaged the attention of Horticulturists in England, many of the observations now made by Mr. HEMPEL, had been anticipated by Papers relating to the subject which had been printed in our *Transactions*. The principal point of novelty brought forward is a distinction between the operation of ringing for the purpose of making trees productive, and that used with an intent to accelerate the maturity of the fruit, to encrease its size, and to improve its flavour. To the former Dr. NOEHDEN has applied the term *Production Ringing*, the latter he has called *Maturation Ringing*. These two operations, which hitherto had not been sufficiently discriminated, are quite distinct, differing not only in their effects, but in the time when they are to be performed, and also in the period when the result of the practice is obtained.

Production Ringing shows its effect in the year after it has been performed, *Maturation Ringing*, in the same season. The former, which is what is usually signified by the term *Ringing*, and which, it is found, may be practised at any time while the trees are divested of their leaves, is now so well understood that little additional information can be expected. In the other practice, the observations and instructions of Mr. HEMPEL will be of some value. The operation of *Maturation Ringing* should be deferred till the flowers are

fully expanded, or rather till they are passing into fruit, or even till the fruit is set. The sap being interrupted in its descent by the annular incision, is held in the bough, and thus the fruit gains a more ready and uninterrupted supply of nourishment, the consequence of which is not only an increase of size but earlier maturity. This operation, besides, may be serviceable in ripening the seeds of plants, which otherwise would not be perfected, for as the fruit is sooner ripened so the seeds well likewise be sooner matured.

When the influence of ringing is limited to three or four months, as in the case of Maturation Ringing, it is obvious that the ring need not be so broad as when it is to be extended to a longer period; from which it follows that Maturation Ringing, as it keeps the bark separated for a shorter period, will do less injury to the health of the branch than the other mode.

Ringing is an excellent method for making layers of hard-wooded plants strike root with greater certainty, and in a smaller space of time than is attained in any other way. The accumulated vegetable matter in the callus, which is formed on the upper edge of the ring, when brought into contact with the soil, or any material calculated to excite vegetation, readily breaks into fibres and roots. By this means cuttings may be rendered more tractable for propagation. If a ring be made on the shoot which is to furnish the cutting, a callus will be created, which, if inserted in the ground after the cutting is taken off, will freely emit roots. A ligature would perhaps operate in a similar manner, though not so efficiently; it should tightly encircle the shoot destined

for a cutting, and the latter should be taken off when an accumulation of sap has apparently been produced. The amputation in the case of the ligature, as well as in that of the ring, must be made below the circles, and the cutting must be so planted as to have the callus covered with earth.

SEPTEMBER 19, 1820. A communication was this day received from Mr. DANIEL MAC LEOD, gardener to CHARLES HAMPDEN TURNER, Esq. at Rooksnest, in Surrey, of his *Method of growing Cape Brocoli*, by which his plants not only produce very superior sized heads, but never button. In the end of May, after having prepared the ground, he treads it firm, and by the assistance of a line, sows his seeds in rows two feet apart, dropping three or four seeds into holes two feet distance from each other in the row. When the seeds vegetate he destroys all except the strongest, which are protected from the fly, by sprinkling a little soot over the ground; as the plants advance they are frequently flat hoed until they bear their flowers; they are once earthed up, during their growth. A specimen of the Brocoli thus grown was exhibited by Mr. MAC LEOD on the 5th of September; the head was compact and handsome, measuring two feet nine inches in circumference, and weighing, when divested of its leaves and stalk, three pounds; the largest of its leaves was upwards of two feet long. Mr. MAC LEOD adopts the same mode in the cultivation of spring sown Cauliflowers, Lettuces, and almost all other vegetables, avoiding transplanting as much as possible.

September 19, 1820. Mr. Patrick Flanagan, gardener to Sir Thomas Hare, Bart. sent to the Meeting this day, *two specimens of a Cucumber*, one in its green, and the other in its ripe state. The green one measured about seventeen inches in length, and near seven inches in circumference, and weighed twenty-six ounces. It was crisp, tender, and of a superior flavour. The skin is a dark green sprinkled with minute white spots, having few spines, and those not prominent. The ripe one, sent for seed, measured twenty-five inches and a half in length, eleven inches and a half in circumference, and weighed upwards of six pounds. Mr. Flanagan states that he has frequently grown these cucumbers, in high perfection for the table, near two feet long: in 1811 he produced one in a stove which measured thirty-one inches in length, was twelve inches in circumference, and weighed eleven pounds; this was exhibited at the time in Messrs. Warner and Seaman's seed-shop, Cornhill. This is a remarkble variety of the Cucumber, combining with such extraordinary vigour of growth, so much excellence of flavour as to make it particularly deserving of notice. Some seeds were communicated to the Society, and have been distributed under the name of *Flanagan's Cucumber*. The sort was obtained by Mr. Flanagan in 1804, from a friend in Buckinghamshire. It keeps true to itself, without variation; but it is difficult to make it yield seed. It requires to be grown in high temperature.

October 3, 1820. Mr. William Buck, gardener to the Hon. Fulk Greville Howard, exhibited *seven bearing Plants of Vines in Pots*, from the garden at Elford Hall, near Lichfield. The plants were one and two years old from

the eye or cutting, before they began to produce their present crop; each Vine had three or four perfect sized bunches on it; the varieties were the Red Frontignac, the Black Hamburgh, the White Frontignac, the Finger Grape, or Cornichon blanc of DUHAMEL, the Black Prince, the Black St. Peter's, and the White Muscadine. Mr. BUCK finds this method of obtaining Grapes answer particularly well, and by removing the pots in the winter months, when the fruit is full ripe, into a dry airy situation, he can preserve it fit for the table much longer than he can in the vinery, when cloudy and damp weather prevails.

OCTOBER 3, 1820. ROGER WILBRAHAM, Esq. sent *Specimens of the Scarlet Nonpareil from ringed and unringed branches*, on a standard tree. Those from the ringed branch were high coloured, and measured two inches and five-eighths in heighth, and two inches and three-eighths in width. Those from the unringed branches were still green, and far from being ripe; and the largest measured only an inch and a half in height, and two in width. Mr. WILBRAHAM also sent specimens of other Apples, in which the effect of ringing in increasing the brilliancy of colour was most remarkable. It seemed, however, to injure the flavour. The operation was performed in April; Mr. WILBRAHAM had in the spring ringed several trees of different kinds of fruits, in his garden, and the impression which the effects had made on him, as well as on his gardener, was unfavourable to the practice. With Plum and Cherry trees it did not succeed at all; the Peaches and Nectarines which had been ringed, for a time, shewed fruit of a larger size, but it

subsequently languished and shrivelled up; with the Apple trees, in some cases, the same consequence was observed, and when these were heavily laden with fruit, the whole bough was liable to be broken off at the ringed place, by a high wind. All the boughs above the incision assumed an autumnal appearance much ealier than usual, and lost their leaves prematurely. This would naturally be the case where the union of the edges of the ring had not taken place before the autumn, and when such re-union is not made, it may be concluded that the ring was originally too wide.

November 7, 1820. A communication was received from Mr. James Brown, gardener to the Marquess of Buckingham, *on the advantages of a span-roofed Glass house for forcing Peaches.* The house described runs from north to south, is fifty feet long by twelve feet wide; the frame-work stands on upright brick-work, three feet above the ground level, having no upright glass; the slope of the glass is ten feet each way, facing east and west; the flue entering at the north end (which is all of brick) is carried round the house and goes out into the chimney, over the fire place. The south end is upright glass, in which is the door of entrance. The trees, being half-standards, are planted on the outside borders, and are carried in a sloping direction into the house through the wall under the glass; the branches are trained to wires strained in horizontal lines ten inches from the glass. This construction of houses has the greatest possible productive surface exposed to the light in a given space; but the external atmosphere having access to it through the glass on all sides, it is not adviseable to use it for very early forcing.

Twelve trees which were planted in the house, six on each side, in the autumn of 1817, averaged a produce of seven dozen Peaches to a tree three years after. The borders were formed of good fresh loam, without any manure, and are well drained; the forcing is begun in the middle of February, when the borders are covered with loose horse dung mixed with leaves twelve inches thick, and the stems of the trees are protected by hay-bands. For a few days after the glass is put on, no fire is lighted; after the fire commences the heat is kept to 50°, till the end of February, it is then encreased to 55°, and kept between that and 60° till the fruit is set and stoned, after which the temperature is increased by fire to about 65°, till the fruit is ripened; the sun heat is allowed to raise the thermometer 10° above this temperature, especially after the stoning, before it is thought necessary to admit air. The fruit begins to ripen about the middle of July, and the crop continues productive till the beginning of September.

November 7, 1820. Aylmer Bourke Lambert, Esq. sent from his garden at Boyton, in Wiltshire, *some Fruit of the Trapa Natans*,* the imported seeds of which had vegetated freely. The plant is an annual, abundant in the south of Europe, growing in deep, muddy, and stagnant waters; in its general appearance, it is ornamental. It grows freely in its native places, but the difficulty of transmitting it has been great, owing to the seed quickly losing its vegetative powers. The seed must be carried immersed in water, in which it will put out its roots, and may be afterwards transferred to the place destined for

* See Botanical Register, vol. iii. plate 259.

it to grow in. The plant is called by the French *Macre ;* its seeds are used in the dessert, either raw or roasted like Chestnuts ; they contain a white farinaceous kernel, the size of a large nut, which is very agreeable to the taste. In this country the Trapa Natans requires a high temperature, and the aid of bottom heat for its support. Mr. Lambert cultivates it successfully in very large earthen pans plunged in the bark-bed. When the fruit intended for seed has dropped into the water, the pans in which the plants grew are taken out of the hot-house, the water in them is changed, and they are then placed in the green-house; about March they are returned to the stove, when the seeds soon vegetate. Whilst the plants are young they require the water to be changed.

November 21, 1820. The Rev. George Swayne, whose attention to the propagation of Fig trees, in the west of England, has been already noticed, exhibited some of the produce of his trees in a *dried state.* They were of the common Blue Fig, which had been suffered to remain on the trees as long as the weather continued dry, and were afterwards hung up in crape bags in an airy kitchen. When the moisture had evaporated they were packed, being sprinkled with a little powdered sugar, to prevent their adhering to each other. They had all the appearance of foreign Figs, were good and pleasant, though perhaps not so rich as the best of those imported from Turkey.

December 4, 1820. Thomas Hunt, Esq. of Stratford-on-Avon, in a letter to the Secretary, received this day, continued his *Observations on the subject of Ringing*, to which he has for

some time paid much attention, and has in consequence become expert in the application of the practice. He observes, "The ringing system has answered extremely well with me this year, in some instances, in the Apple trees; the branches that were ringed last year were the only branches on the tree which bore fruit, but the branches on which the rings have not closed (though they shew well for fruit next year) have not made any shoots above the rings, and I much doubt whether they will be able to support the fruit they produce; the ringed branches which did close up in the season have made very vigorous shoots, and shew great prospect of abundance of blossom. With respect to Pear trees I think that ringing answers particularly well, as it not only encreases the size of the fruit, but it assists in ripening it, particularly in the Colmar, which never ripened well in my garden till I had ringed the branches; in Pear trees the ring always closed in good time, and the trees are as vigorous, and shoot as fine as if they had never been ringed at all. I have ringed three Plum trees, the Green Gage, the Blue Gage, and the Blue Pedrigon, all of which did well, and gummed very little; the fruit was much larger, and ripened more than a week sooner than the fruit on the other parts of the tree. I also ringed a Gooseberry tree, a Currant tree, and some Cherry trees; on the Gooseberry tree it had a very good effect, the Gooseberries being, on the ringed side of the tree, nearly as large again as those on the other part of the tree, and they ripened at least a week sooner; but on the Currant and Cherry trees, it had no good effect. I intend, however, to try it again, as I think I made the rings too wide, and I am satisfied that in no instance the ring should be made wider than a quarter of an inch,

except in Pear trees, on which I have made the rings more than half an inch, and they have always closed up in good time."

December 5, 1820. Amongst other notices relative to the management of fruit trees, contained in a communication read this day, from M. Dubreuil, Director of the Botanic Garden at Rouen, a Corresponding Member of the Horticultural Society, is the following table, containing the result of his experiments and observations on the *sorts of Stocks* to be used with fruit-trees in different soils.

	Argillaceous.	Chalky.	Silicious.	Light Soil.
Apples.	Doucin.	Free Stock.	Free Stock.	Doucin.
Pears.	Quince Stock.	Free Stock.	Free Stock.	Quince Stock.
Peach.	Plum Stock.	Almond.	Almond.	Almond.
Cherry.	Wild Cherry.	Mahaleb.	Mahaleb.	Wild Cherry.

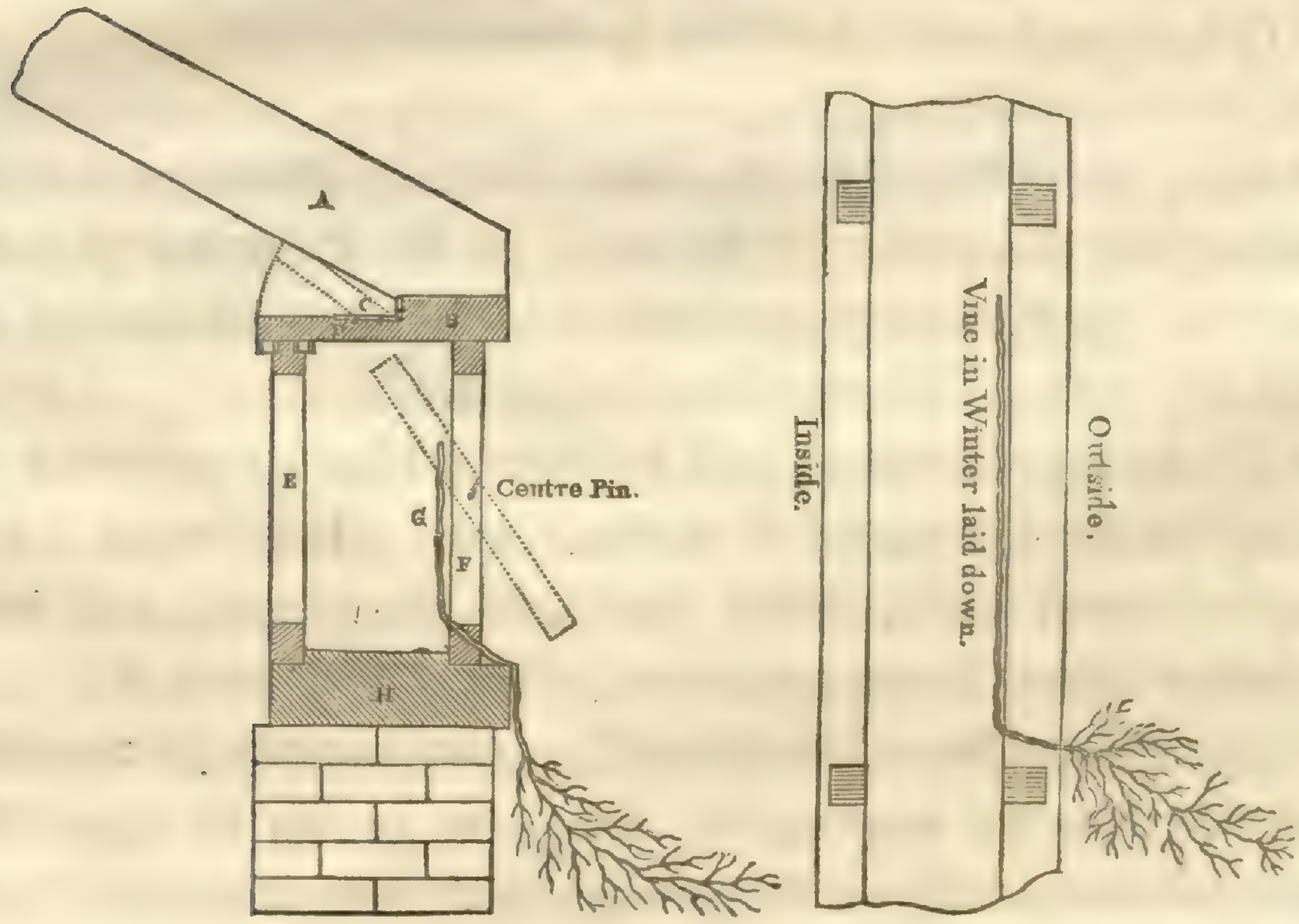
This is a subject which has attracted but little attention amongst gardeners in England, and is highly deserving of enquiry. It will be necessary to give a short account of the different sorts of stocks which are named in the above table, and used in France.

The Apple stocks have already been described at page 411 of this volume. The *Pomme Franc*, or *Sauvage* (Free Stock) is used usually for the large orchard trees. The *Pomme Doucin*, for trees which it is wished to obtain of only a middling size. The *Pomme Paradise*, not mentioned in the above table, is worked only for dwarf garden Apples. The Quince stocks are used for Pears, as the Paradise are for Apples; and the standard Pears are grafted on the *Poire Sauvage*, called Free Stock in the table. The *Prune St. Julien* is

the general stocks for Plums, and is also used for particular Peaches, but Almonds are chiefly used for the latter. The *Prunus Mahaleb* is the stock used for dwarf Cherries, and the Wild Cherry supplies them with stocks for standards.

JANUARY 18, 1821. SAMUEL GALTON, Esq. of Birmingham, in a Letter to the Secretary, of this date, described the *Plan of exposing the Branches of Vines* growing in a stove to the external air, without the necessity of suspending the forcing or heat in the stove, or of drawing the stems back through the apertures by which they are introduced into the house. Mr. GALTON had observed this put in practice at Derby, in the garden of Mr. JOSEPH STRUTT, of that town, where it has been in successful use for above fifteen years. The annexed design will assist the explanation.

Section. Plan.



The foundation wall in front of the house is capped with a stone sill H ; the front upright lights F move on centre pins, and can be taken out from their places without disturbing the rafter plate B, or the uprights which support the plate ; these lights, when taken out, can be fixed by the lower ends to the inner side of the stone sill, the spaces of the upright being filled by other pieces whilst the tops are held by a board D longitudinally fixed to the rafter by hinges C, and capable of being raised and let down at pleasure. When the Vines are to be exposed they are unfixed from their places between the rafters and laid down on the stone sill ; the front upright lights F are then taken out and fixed on the inner side of the sill E, thus leaving the whole of the Vine on the outside of the house, and under cover, protected from rain, until it is desired to put it again into heat, when the situation of the upright lights is changed, and they are replaced in their former situation. *A* is the rafter of the house, and G the position of the Vine in summer.

April 2, 1821. Mr. Joseph Busch, gardener to His Majesty the Emperor of Russia, at St. Petersburgh, in a Letter to the Secretary, received this day, communicated the following *notes on Horticultural subjects.*

" Hydrangea hortensis will be turned blue by watering the young plant, the summer before, with allum water. Our gray coloured earth, under the black moor earth, will have the same effect, being combined with aluminous salt.

" Sprinkling Gooseberry and Currant bushes with tar water prevents the fly settling on the plant to lay its eggs ; this must be done early in the spring, for if done after the fruit is set, it will taste of tar.

"If in a patch of ground, where Cabbages are to be planted, some Hemp seed be sown all round the edge, in the spring, the strong smell which that plant gives in vapour, will prevent the Butterfly from infesting the Cabbages. The Russian peasantry, in those provinces where Hemp is cultivated, have their Cabbages within those fields, by which they are free from Caterpillars."

April 17, 1821. At the Meeting this day, a Letter from Charles Holford, Esq. at Hampstead, to the Secretary, was read, as follows: "As garden walls are much injured by the use of nails and shreds, I have substituted a mode of fastening the trees which fully answers the purpose, without any of the disadvantages attending the usual practice. I affix copper wires from the top to the bottom of the wall, in a perpendicular direction, secured at each end by a small iron hook, two iron stair-staples are also driven in over the wires, at equal distances, to keep them nearly close to the wall. The wires may be placed at six to eight inches distance from each other. The branches and shoots are fastened by means of thin twine, which is first tied to the wire with a single knot, and then round the shoot more or less tight, according as it may be required to check or encourage the circulation of the sap; with a very little practice this may be done with great expedition. The wire which I have used is of the substance measuring about twenty yards to the pound weight, and as it does not oxydate by exposure to the atmosphere, will not require painting, and will last for years. The expense is about one penny per yard. I have not found the Peaches and Nectaarines to be at all retarded by this mode of training.

April 30, 1821. The following communication was received by the Secretary, from John Wedgwood, Esq. "I have been trying an experiment with *Buda Kale*, which has answered completely, this is blanching it as you do Sea Kale, by turning a pot over it, and letting it remain covered till it is quite blanched. When cut and dressed in that state it is excellent, and one advantage will be, that the same plant will furnish two cuttings, for the sprouts are more delicate than even the original heart of the plant. I used no dung to force it, but this might be applied with great advantage; and I think it would be an excellent substitute for Sea Kale."

LXXXVIII. *On the* Cultivation *of* Chinese Chrysanthemums. *In a Letter to the Secretary. By Mr.* Joseph Wells, *Gardener to* William Wells, *Esq. F. H. S.*

Read December 4, 1821.

Sir,

In consequence of your commendations of the *Specimens of Chrysanthemums*, which I had the pleasure of shewing you lately, and of your desire to be informed of my mode of treating the plants, I now submit an account of my practice to you.

In the last week of May, or early in June, I take cuttings of the plants five or six inches in length, and plant them under a north wall, placing a hand-glass over them. When they have struck root it is necessary to admita little air to them, to prevent their being drawn up weak. In a few days after they are well rooted, I take them up, and plant them singly in as small pots as they can conveniently be put into, shading them until they have recovered this removal; I then select an airy border at a distance from any wall or building into which I plunge the pots up to their rims, the plants will speedily fill the pots with roots, which will also soon extend over the rims. It is then necessary to raise and re-plunge the pots, this checks the too rapid growth of the young plants.

Whilst in this border they require to be watered pretty freely. When they begin to put forth shoots, I determine

on the number of those I wish to retain, which is usually about three. I pick off all the others, and never suffer more to grow either from the stem or from the roots.

Early in September, I shift the plants into thirty-two size pots, using rich mould in the planting; they are not again plunged, but kept in an airy part of the garden, until frost, or bad weather, obliges me to remove them into the conservatory. After the shifting, I water them occasionally with rich liquid manure, the drainage of a sewer, and which is composed of soap-suds and other matters. When they begin to shew for blossom, I examine them at different times, and by thinning reduce the number of flower buds.

The advantages resulting from the above mode of treatment are, that the flowers are large, and the plants dwarf, not being higher than from two to three feet; they are besides full of large, perfect, and healthy leaves. Neither am I under the necessity of preserving so many old plants through the winter, for two or three of each sort will produce abundance of shoots, after the flowering stems are cut down, to furnish cuttings in the spring.

I have adopted the above practice for three seasons; the addition of the liquid manure, I have used this season at the suggestion of a Chinese, who informed me that it is constantly employed in the cultivation of this plant in China.

The plants, when treated as I have described, are very different in their appearance from the Chinese Chrysanthemums, as usually grown; they have no shoots from the roots, which allows the strengh of the plant to go to the blossoms, a single stem rises from the pot, and at the height

of four or five inches branches off into two, three, or more flowering stems, from one to two feet long, terminated by large flowers, and covered in their whole length by vigorous foliage.

I am, Sir,

Your obedient humble Servant,

Joseph Wells.

Redleaf, near Tonbridge,
December 2, 1821.

LIST OF AUTHORS,

WITH

the Title of their respective Communications.

JOHN TOWNSEND AITON, ESQ.

On Forcing Plums, - - - - p. 531

MR. DAVID ANDERSON.

Account of a New Melon, with a Description of the Method by which it was obtained - - - - - p. 318

MR. JOHN ANDERSON.

Account of a New Esculent Vegetable called Tetragonia, or New Zealand Spinach - - - - - p. 488

MR. RICHARD AYRES.

On the Management of the Plants belonging to the Genus Citrus, in the Garden of Edward Miller Mundy, Esq. M. P. F. H. S. at Shipley Hall, in Derbyshire - - - - - - p. 306

MR. THOMAS BALDWIN.

Plan for Forcing Sea Kale, without covering the Crowns of the Plants with Dung or Litter - - - - - p. 63

MR. THOMAS BLAKE.

The Method of Propagating choice Dahlias by grafting their Shoots on the Tubers of the Roots of more common kinds - - p. 476

MR. WILLIAM BUCK.

Notice of a Pit for fruiting Pines and Melons, with Observations on the Production of Seeds of Pine Apples - - - p. 533

MR. SAMUEL BROOKES.

Notice relative to the Flowering of Lilium Japonicum p. 551

MR. JOSEPH BUSCH.

Observations on a Method of Training Apple, Cherry, and Plum Trees, in Russia, to preserve them from Frost during the Winter - p. 405

MR. MARTIN MILLER CALL.

Description of the Steam Pits, in the Imperial Gardens of the Taurida at St. Petersburgh - - - - - - p. 468

WILLIAM CATTLEY, ESQ.

Account of a New Psidium - - - p. 315

MR. ROBERT CHAPMAN.

On the Cultivation of the Granadilla, or Passiflora quadrangularis. p. 60

MR. WILLIAM CHRISTIE.

Account and Description of the Varieties of Autumn and Winter Radishes p. 10

Description and Account of the different Varieties of the Garden Carrot p. 383

REV. THOMAS GERY CULLUM, A. M.

On the Construction of Piers and Copings of Garden Walls - p. 269

MR. PATRICK FLANAGAN.

A practical Account of the Culture of Early Melons - - p. 187

SIR THOMAS FRANKLAND, BART.

On the Means of Destroying Wasps - - - p. 107

REV. THOMAS GARNIER.

Observations on the Cultivation of Strawberries; with Remarks on the rapid formation of their Blossoms and Fruit - - - p. 479

JAMES ROBERT GOWEN, ESQ.

On the Production of a Hybrid Amaryllis - - p. 498

MR. WILLIAM GRIFFIN.

On the Management of Grapes in Vineries, - - p. 98

ROBERT HALLETT, ESQ.

On the Cultivation of the American Cranberry in dry Beds - p. 483

MR. CHARLES HARRISON.

An Account of the Produce of the Peach Trees in the Garden at Wortley Hall, since the Year 1808, inclusive - - - p. 79

ABRAHAM HAWKINS, ESQ.

Notice relative to the Flowering of the Agave Americana in the open Air, in the Garden of James Yates, Esq. at Woodville, near Salcombe, in Devonshire p. 389

MR. JOSEPH HAYWARD.

An Account of a Steam Apparatus - - - p. 434

HON. AND REV. WILLIAM HERBERT.

On the Production of Hybrid Vegetables ; with the Result of many Experiments made in the Investigation of the Subject - - p. 15

On the Culture of the African Gladioli, and other Cape Bulbs in the open Borders - - - - - - p. 159

On the Culture of Hyacinths - - - p. 163

On the Culture of the Guernsey Lily, and other Bulbs of the Genera Nerine, Coburgia, and Brunsvigia, heretofore united under Amaryllis - p. 176

On the Treatment of the Dendrobia, Aerides, and other parasitical Plants p. 241

MR. THOMAS HOGG.

On the Cultivation of Pinks - - - p. 451

ROBERT HOLDEN, ESQ.

Description of a Screen for protecting Wall Trees - - p. 93

WILLIAM HOOKER, ESQ.

Description of a Mode of cultivating Pines, as practised in the Garden of Mr. Thomas Jenkins, F. H. S. at the Portman Nursery, New Road St. Mary-le-bone - - - - - - p. 363

MR. STEPHEN JEEVES.

On a new Method of training Gooseberry Bushes - - p. 194

MR. DANIEL JUDD.

Account of an improved Method of planting Vines for forcing - p. 4

HENRY BELLENDEN KER, ESQ.

Account of the Cultivation of the Water Cress, as practised by Mr. William Bradbery, at West Hyde, near Rickmansworth, in Hertfordshire p. 537

THOMAS ANDREW KNIGHT, ESQ.

Upon the Means of giving Strength to the Stems of Plants growing under Glass - - - - - - p. 1

Upon the Culture of the Pine Apple, without Bark or other Hot-bed p. 72

On the most economical Method of employing Fuel in heating the Flues of Forcing Houses - - - - - p. 156

Physiological Observations upon the Effects of partial Decortication, or Ringing the Stems or Branches of Fruit Trees - - - p. 159
Further Particulars of the Downton Strawberry - p. 197
Upon the Culture of the Fig Tree, in the Stove - - p. 200
On the Cultivation of the Cocks-comb - - - p. 321
Observations on Hybrids - - - - - p. 367
Directions for preserving Buds of Fruit Trees in a vegetating State, when sent to considerable distances - - - - p. 403
Upon Pruning and Training the Plum Tree - - p. 426
Upon the Managing of Fruit Trees in Pots - - p. 439
An Account of an improved Method of raising Early Potatoes in the open ground p. 447
On Grafting the Vine - - - - p. 495
On the Cultivation of the Pine Apple - - - p. 543

MR. GEORGE LINDLEY.

An Account of some of the best Varieties of Apples peculiar to, or cultivated in the County of Norfolk - - - p. 65

JOHN LIVINGSTONE, ESQ.

Account of the Method of Dwarfing Trees and Shrubs, as practised by the Chinese, including their Plan of Propagation from Branches, - p. 224

MR. JOHN MAHER.

On the Treatment of the Standard Fig Trees in the Gardens at Arundel Castle p. 185

PETER MARSLAND, ESQ.

Account of the Mode of treating Pine Plants, so as to make them produce Fruit within the year - - - - p. 392

MR. JOHN MEARNS.

Account of a New Method of managing Vines in a Common Grapery p. 246

MR. ISAAC OLDAKER.

On the Treatment of the Neapolitan Violets, so as to make them produce a Succession of Flowers, through the Winter - - p. 109
Notices of the proper Method of Treating the Rosa Banksia, so as to make it flower in perfection - - - - p. 170
On the Management of the Roseberry Strawberry, in order to make it produce Fruit through the late Summer, Autumn, and Winter Months - p. 234

MR. JOHN ROBERTSON.

On the Advantages which Trained Peach Trees derive from their Roots being allowed to penetrate the Border on the North side of the Wall p. 95

On the Classification of Plums - - - p. 323

MR. THOMAS ROGERS.

An Account of the Cultivation of Mushrooms - - p. 472

JOSEPH SABINE, ESQ.

Observations on the Glazing of Hot-Houses, &c. - p. 84

Observations on, and Details of, some Experiments in Ringing the Bark of Fruit and other Trees and Plants, - - - p. 121

Account of the Rosa Banksiæ, or Lady Banks's Rose - p. 170

Account of a newly produced Hybrid Passiflora - - p. 258

Account and Description of the Varieties of Double Scotch Roses, cultivated in the Gardens of England - - - - p. 281

Account and Description of the Varieties of Chinese Chrysanthemums which at present are cultivated in England; with Observations on the Difference between the Chrysanthemum Indicum of Linnæus and those Plants p. 326

On the Ayrshire Rose - - - - - p. 456

Account of some Standard Fig Trees in a Garden at Sompting, near Worthing, in Sussex - - - - - p. 504

CHEVALIER FRANCIS DE PAULA SCHRANK.

Account of a successful Method of managing Aquatic and Bog Plants, as practised in the Royal Botanic Garden at Munich - - p. 395

M. JOSEPH CORREA DE SERRA.

Notice respecting several Vegetables used as Esculents in North America p. 443

ALEXANDER SETON, ESQ.

An Account of Mr. Walker's improved Construction of Hot-house Flues p. 237

MR. HENRY SILVERLOCK.

Account and Description of a Hollow Wall, erected in the Garden of the Earl of Arran, at Bognor, in Sussex - - - p. 244

REV. GEORGE SWAYNE, A.M.

On the Management of the Fig Tree in the open air - - p. 428

MR. THOMAS TORBRON.

Instructions for Forcing Cherries - - - - p. 116

MR. JOHN TURNER.

Description of some Varieties of Pears and Apples received by the Society in the same Seasons of 1818 and 1819, from Mr. Louis Stoffles, of Mechlin in Flanders, Corresponding Member of the Horticultural Society - p. 274

RICHARD VACHELL, ESQ.

On a Method of raising Early Cucumbers - p. 455

MR. JAMES VERRELL.

Notice relative to the Management of the Crinum Amabile; with some Account of, and Observations on, the Plant so named - p. 419

MR. JOSEPH WELLS.

On the Cultivation of Chinese Chrysanthemums - - p. 571

MR. JOHN WEST.

Description of an improved Forcing Pit - - - p. 220

JOHN WILLIAMS, ESQ.

Account of the Alexandrian Ciotat Grape, a new Seedling Variety p. 8

Notice respecting the Pitmaston Orange Nectarine - p. 232

REV. WILLIAM WILLIAMSON, A. M.

On the Cultivation of the Filbert, describing the Method of Pruning, as practised in the Grounds near Maidstone in Kent - - p. 145

On the Cultivation of the Ranunculus and Anemone - - p. 374

List *of* Drawings *executed by* Order *of the* Council *between* *May* 1, 1819, *and May* 1, 1820.

1. The Beauty of Kent Apple.
2. The Borsdorff Apple.
3. The Gravenstein Apple.
4. The Keswick Codlin.
5. The Oslin Apple.
6. The Early Russian Apple.
7. The Trumpington Apple.
8. The Algiers Apricot.
9. The Breda Apricot.
10. The Kishmush Grape.
11. Aiton's Seedling Nectarine.
12. The Old Newington Nectarine.
13. The Red Roman Nectarine.
14. The Bourdine Peach.
15. The Galande Peach.
16. The Red Magdalen Peach.
17. The Scarlet Beurrée Pear.
18. The Welbeck Seedling Pine.
19. The Gisborne Plum.
20. Wilmot's Green Gage Plum.
21. The Morocco Plum.
22. Wilmot's Early Orleans Plum.
23. Wilmot's Early Violet Plum.
24. The Chili Strawberry.
25. The Downton Strawberry.

List *of* Drawings *of* Fruits *executed by* Order *of the* Council, *between May* 1, 1820, *and May* 1, 1821.

1. The Dutch Codlin.
2. The Spring Grove Codlin.
3. The Wax Apple.
4. The Wormsley Pippin.
5. The Brussells Apricot.
6. The Carnation Cherry.
7. The Tartarian Crab.
8. The Black Corinth Grape.
9. The Poonah Grape.
10. The Green-fleshed Egyptian Melon.
11. The Persian Dampsha Melon (first fruit).
12. The Persian Dampsha Melon (second fruit).
13. The Cowdray White Nectarine.
14. Williams' Orange Nectarine.
15. Lambert's Large Nut.
16. The Spring Grove Peach.
17. The Boyle Farm Wilding Pear.
18. The Elton Pear.
19. The Little Muscat Pear.
20. The Summer Bon Chretien Pear.
21. The Green Antigua Pine.
22. The Mimms Plum.
23. The Pear-shaped Service.
24. Wilmot's Cocks-comb Scarlet Strawberry.
25. The High-flyer Walnut.

List of MEDALS *and* REWARDS *presented by* ORDER *of the* COUNCIL *of the* HORTICULTURAL SOCIETY *of* LONDON, *from May* 1, 1819, *to May* 1, 1820.

July 15th. To NATHANIEL WALLICK, M. D. Superintendant of the Botanic Garden at Calcutta, Corresponding Member of the Society, the Silver Medal, for his attention to the Society, in sending it a rich Collection of Seeds of Plants and Vegetables, partly collected in the Napal country, and partly from the Botanic Garden at Calcutta.

July 23d. To GEORGE CASWALL, Esq. of Sacombe Park, Hertfordshire, Fellow of the Society, the Silver Medal, for the splendid Collection of forced Grapes exhibited by him to the Society at the Meeting on the 6th of July.

July 23d. To Mr. JOHN WILMOT, of Isleworth, Fellow of the Society, a framed and glazed Drawing of the Blood-Red Pine, (grown by him and exhibited at a Meeting of the Society,) as an acknowledgment of the sense the Council entertains of his attention to the interests of the Society on various occasions.

September 8th. To Mr. DAVID ANDERSON, Gardener to the Viscount MONTAGUE, at Ditton Park near Windsor, the Silver Medal, for various exhibitions of particularly fine grown Fruits and Vegetables, made by him at different Meetings of the Society in the present year.

September 22d. To Mr. GEORGE WHITE, Corresponding Member of the Society, Gardener to BENJAMIN BENYON, Esq. at Haughton Hall, near Shiffnal, the Silver Medal, for his skill in the cultivation of Grapes, as exemplified in the specimens which he has at different times presented to the Society.

September 22d. To Mr. Samuel Rintoul, Gardener to the Right Honourable the Earl of Liverpool, at Walmer Castle, the Silver Medal, for the fine specimens of Onions grown by him, which have been exhibited at a Meeting of the Society.

September 22d. To Mr. Isaac Oldaker, Fellow of the Society, Gardener to His Majesty the Emperor of Russia, the Silver Medal, for the various specimens of different Fruits and Vegetables grown by him in the Garden of the Right Honourable Sir Joseph Banks, Bart. G. C. B. at Spring Grove, which have been exhibited at various Meetings of the Society.

September 22d. To Mr. William Vinden, Gardener to Roger Wilbraham, Esq. a Reward of Three Pounds for the many fine specimens of Fruits and Vegetables grown by him in Mr. Wilbraham's garden at Twickenham, and exhibited by him at different Meetings of the Society.

November 17th. To Mr. Robert Hedley, Corresponding Member of the Society, Gardener to Thomas Meynell, Esq. at Yarm, near Stockton-on-Tees, the Silver Medal, for the very fine specimens of Peaches sent by him to the Meetings of the Society in the Seasons of 1818 and 1819.

November 17th. To Mr. Thomas Tanner, late Gardener to Lord Henry Fitzgerald, at Thames Ditton, the Silver Medal for his skill and attention in propagating numerous varieties of Fruits, and also for the various exhibitions of Fruits which he has at different times made at Meetings of the Society.

December 10th. To John Sudlow, Esq. of Thames Ditton, Fellow of the Society, the Silver Medal, for the various specimens of rare and excellent Fruits grown in his garden, which he has exhibited at different Meetings of the Society.

December 20th. To M. Pierre Philippe André Vilmorin-Andrieux, of Paris, Corresponding Member of the Society, the Silver Medal for the valuable information communicated by him in his correspondence with the Society, and for the

various seeds and plants sent by him for the Garden of the Society.

January 19th. To the Rev. William Williamson, A. M. of Westbere, near Canterbury, Corresponding Member of the Society, the Silver Medal for the various communications made by him to the Society, several of which have been printed in the Transactions.

January 19th. To Mr. William Masters, Jun. of Canterbury, Fellow of the Society, the Silver Medal for the communications made by him to the Society, and for various articles exhibited by him at the Meetings of the Society, and presented by him to the Garden of the Society.

January 19th. To M. Louis Stoffels, of Mechlin, Corresponding Member of the Society, the Silver Medal for the various specimens of new and interesting Fruits sent by him to the Society, in the years 1818 and 1819.

March 22d. To the Rev. George Williams, B. A. of Martin Hussingtree, near Worcester, the Silver Medal, for having produced the Martin Nonpareil, a seedling apple of great excellence, of which an Account has been published in the Transactions of the Society.

April 5th. To the Rev. William Williamson, A. M. of Westbere, near Canterbury, Corresponding Member of the Society, for his Paper on the Cultivation of the Filbert, as practised in the grounds round Maidstone, in Kent; the subject being one of those for which Medals and Rewards were offered at the last Anniversary.

April 5th. To Mr. Thomas Torbron, Corresponding Member of the Society, Gardener to the Earl of Bridgewater, at Ashridge, Hertfordshire, the Silver Medal for his Paper on the Forcing of Cherries, which is printed in the Transactions.

List of MEDALS *and* REWARDS *presented by* ORDER *of the* COUNCIL *of the* HORTICULTURAL SOCIETY *of* LONDON, *from May* 1, 1820, *to May* 1, 1821.

September 6th, 1820. To the Hon. and Rev. WILLIAM HERBERT, D. C. L. Fellow of the Society, the Silver Medal, for his various communications on the cultivation of Bulbous Plants, which are printed in the Transactions.

September 6th, 1820. To Mrs. ELIZABETH DAVEY, the Silver Medal, for her skill and attention in increasing the varieties of Geraniums during the last ten years, and more particularly for the production of that variety exhibited to the Society at the Meeting on the 6th of June last.

October 10th, 1820. To Mr. JOHN MEARNS, Corresponding Member of the Society, Gardener to WILLIAM HANBURY, Esq. F. H. S. at Shobden Court, Herefordshire, the Silver Medal, for his Paper on the Management of Vines in a common Grapery, which is printed in the Transactions.

October 10th, 1820. To Mr. JOHN ROBERTSON, Fellow of the Society, the Silver Medal, for his various communications, which are printed in the Transactions.

October 10th, 1820. To Mr. THOMAS JENKINS, Fellow of the Society, the Silver Medal, for his skill in the Cultivation of Pines, as detailed in a Paper by WILLIAM HOOKER, Esq. F. H. S. which is printed in the Transactions.

November 17, 1820. To Mr. RICHARD AYRES, Corresponding Member of the Society, Gardener to EDWARD MILLER MUNDY, Esq. M. P. F. H. S. at Shipley, in Derbyshire, the Silver Medal, for his Paper on the Management of the Plants

of the Genus Citrus in the Conservatory at Shipley, which is printed in the Transactions.

November 17th, 1820. To William Cattley, Esq. Fellow of the Society, the Silver Medal, for the spirit manifested by him in the Cultivation of Tropical Plants, and particularly for having fruited the Chinese Guava, specimens of which were shewn at the Meeting of the Society on the 5th of September.

March 9th, 1821. To Thomas Hunt, Esq. Fellow of the Society, the Silver Medal, for his various Communications and Exhibitions of Fruits, and especially for having raised the Seedling Apple, which has been named Hunt's Duke of Gloucester.

March 30, 1821. To Joseph Skey, M. D. Corresponding Member of the Society, resident at the Ionian Islands, the Silver Medal, for his attention to the interests of the Society in sending a valuable collection of plants of Vines and Figs, and of various Seeds and Bulbs from Corfu.

April 6th, 1821. To Joseph Sabine, Esq. F. H. S. and Secretary, the Silver Medal, for his Paper on Chinese Chrysanthemums, which is printed in the Transactions, that being one of the subjects for which a Medal was proposed to be given by the Council at the Anniversary in 1820.

April 6, 1821. To Mr. William Christie, Under Gardener to the Horticultural Society, Three Pounds, for the care and attention given by him in composing his Paper on Garden Carrots, which is printed in the Transactions.

BANKSIAN MEDAL.

In order to encourage the Exhibitions of various productions of the Garden at the General Meetings of the Society, and to distinguish the Exhibitors of articles of excellence, merit, or novelty, the Council have deemed it expedient to establish a class of Medals of a smaller size than the original Medal of the Society.

This resolution having been adopted at the period when the country was deploring the death of the late Sir Joseph Banks, it was determined to place his Profile on the obverse of the Medal; and to call it the Banksian Medal. The Council are well aware that the merits of Sir Joseph Banks, and the services which, through the whole course of his life, he rendered to mankind are so unparalleled, that they will live in the recollection of grateful posterity without the aid of artificial records; but they are so deeply sensible of the peculiar kindness which the Society, in its infancy, received from his fostering hand, that they gladly embraced the opportunity thus afforded them of recording their feelings towards his memory.

The larger Medal will still continue to be given, as directed by the laws of the Society, for every such matter or circumstance as shall appear to the Council so essentially to advance the objects of the Society as to deserve the distinction; whilst the Banksian Medal will be exclusively confined to rewarding the Exhibitors of objects transmitted or brought to the General Meetings of the Society. They will be adjudged by the Council as soon as possible after each General Meeting. The Names of the persons receiving the Medals will be placed on a Tablet in the Meeting Room of the Society, as they are awarded, until the succeeding anniversary,

when the List of the whole preceding year will be printed and published with the Part of the Transactions delivered at the Anniversary to the Fellows of the Society.

N. B. The adjudication of the Banksian Medals for the year ending with the anniversary of 1821, having been deferred until the Die of the Medal was completed, was not made until the termination of the year.

List of BANKSIAN MEDALS *presented by* ORDER *of the* COUNCIL *of the* HORTICULTURAL SOCIETY OF LONDON, *for* EXHIBITIONS *at General Meetings of the Society, from May* 1, 1820, *to May* 1, 1821.

To Mr. PATRICK FLANAGAN, F. H. S. Gardener to Sir THOMAS HARE, Bart. F. H. S. at Stow Hall, Norfolk, for his various Exhibitions of Fruits and other garden productions, during the year.

To Mr. ISAAC OLDAKER, F. H. S. for his various Exhibitions of Fruits and other garden productions from the garden of Lady BANKS, at Spring Grove, during the year.

To Mr. JOHN WILMOT, F. H. S. for his various Exhibitions of Fruits from his garden at Isleworth, during the year.

To Mr. DAVID ANDERSON, F. H. S. Gardener to the Lord MONTAGU at Ditton Park, near Windsor, for his various Exhibitions of Fruits and other garden productions, during the year.

To Mr. WILLIAM MORGAN, F. H. S. Gardener to HENRY BROWNE, Esq. at North Mimms Place, in Hertfordshire, for his various Exhibitions of Fruits and Flowers, during the year.

To JOHN BRADDICK, Esq. F. H. S. for various New Fruits from his garden at Thames Ditton, exhibited by him at different times, during the year.

To Mr. HUGH RONALDS, F. H. S. for his Exhibitions of Peaches, Nectarines, and Apples at various times, during the year.

To Mr. ROBERT CLEWS, F. H. S. Gardener to the Duke of DEVONSHIRE, at Chiswick, for his various Exhibitions of Fruits, during the season.

To Mr. William Masters, F. H. S. for Flowers of Anemones and Ranunculuses grown in his garden at Canterbury, exhibited June 6th, 1820.

To the Hon. Robert Fulke Greville, F. H. S. for a specimen of the Madras Citron from his garden at Castle Hall, in Pembrokeshire, exhibited June 20, 1820.

To Sir Thomas Frankland, Bart. F. H. S. for specimens of the Green-fleshed Egyptian Melon from his garden at Thirkleby, in Yorkshire, exhibited June 20, 1820.

To Edward Barnard, Esq. F. H. S. for specimens of Double Pinks from his garden at Vale Mascal, in Kent, exhibited July 4, 1820.

To the Rev. Thomas Garnier, F. H. S. for specimens of the Mathven Castle and other Strawberries from his garden at Bishopstoke, in Hampshire, exhibited July 4, 1820.

To the Comte de Vandes, F. H. S. for the Exhibition of the Cactus speciosissimus in flower from his garden at Bayswater, exhibited July 18, 1820.

To Mr. James Lee, F. H. S. for specimens of varieties of Russian ten-week Stock, from his garden at Hammersmith, exhibited July 18, 1820.

To Mr. Stephen Jeeves, F. H. S. Gardener to the Lord Dacre at the Hoo in Hertfordshire, for his specimens of Piccatee Carnations, exhibited August 1, 1820.

To Mr. William Griffin, Gardener to Samuel Smith, Esq. M. P. F. H. S. at Woodhall, in Hertfordshire, for specimens of various Grapes, exhibited August 1, 1820.

To Mr. George White, F. H. S. Gardener to Benjamin Benyon Esq. M. P. F. H. S. at Haughton Hall, in Shropshire, for specimens of various Grapes, exhibited August 1, 1820.

To Mr. Matthew Stevens, for a collection of Lancashire Gooseberries from his garden at Harefield in Middlesex, exhibited August 1, 1820.

To Mr. Richard Williams, F. H. S. for a collection of specimens of flowers of Double and Single China Pinks from his garden at Turnham Green, exhibited August 15, 1820.

To Mr Charles Harrison, F. H. S. Gardener to James Stuart Wortley, Esq. M P. F. H. S. for a new seedling black Grape, exhibited August 15, 1820.

To Mr. Thomas Moffat, C. M. H. S. Gardener to the Viscount Sydney, F. H. S. at Frognal in Kent, for specimens of the true Black Hamburgh Grape, exhibited August 15, 1820.

To Mr. Thomas Milne, F. H. S. for specimens of the Hybrid Passiflora Cæruleo-racemosa, produced by him in the garden of Messrs Whitley, Brames, and Milne, at Fulham, exhibited September 5, 1820.

To Mr. Mark Robson, C. M. H. S. Gardener to Ralph Riddell, Esq. at Felton Hall in Northumberland, for specimens of various Grapes, exhibited September 5, 1820.

To Mr. Henry Bailey, F. H. S. Gardener to the Earl Spencer, F. H. S. at Althorpe in Northamptonshire, for his specimens of the Black Hamburgh Grape, exhibited September 5, 1820.

To the Rev. George Swayne, for specimens of ripe Figs from his Garden at Dyrham near Bath, exhibited September 19, 1820.

To Mr. Robert Hedley, F. H. S. Gardener to Thomas Meynell, Esq. at Yarm in Yorkshire, for specimens of various Peaches, exhibited September 19, 1820.

To Mr. William Buck, C. M. H. S. Gardener to the Hon. Fulke Greville Howard, F. H. S. at Elford near Lichfield, for plants of Vines in pots bearing fruit, exhibited October 3, 1820.

To Mr. James Hay, C. M. H. S. of Arno's Vale, near Bristol, for Black Jamaica Pines, exhibited October 3, 1820.

To Frederick Garsham Carmichael, Esq. F. H. S. for a Green Antigua Pine from his garden at Twickenham, exhibited October 3, 1820.

To Peter Marsland, Esq. F. H. S. for his Pines ripened within the year in his garden at Woodbank, exhibited October 17, 1820.

To M. Le Chevalier Parmentier, C. M. H. S. for a collection of specimens of Flemish Pears sent from his garden at Enghien, in Flanders, exhibited November 7, 1820.

To Major Gen. Le Couteur, C. M. H. S. for a collection of specimens of Pears from Jersey, exhibited November 7, 1820.

To Mr. John Taylor, Gardener to the Earl of Dunmore, F. H. S. at Dunmore Park in Stirlingshire, for a collection of Pears and Apples, exhibited November 7, 1820.

To Mr. John Mearns, F. H. S. Gardener to William Hanbury, Esq. F. H. S. at Shobden Court in Herefordshire, for a collection of cyder and other Apples, exhibited November 7, 1820.

To Harry Dobree, Esq. C. M. H. S. for a new Seedling Apple from Guernsey, called Mollett's Guernsey Pippin, exhibited November 7, 1820.

To M. Dumortier Rutteau, C. M. H. S. for a collection of Flemish Pears from Tournay in Flanders, exhibited November 7, 1820.

To Mr. Joseph Kirke, F. H. S. for the collection of Apples from his garden at Brompton, exhibited November 21, 1820.

To Richard Arkwright, Esq. F. H. S. for specimens of retarded Grapes from his garden at Willersley, in Derbyshire, exhibited December 19, 1820.

To Mr. Louis Stoffels, C. M. H. S. for a collection of Flemish Apples sent from Mechlin in Flanders, exhibited December 19, 1820.

To Mr. Daniel Judd, F. H. S. Gardener to Charles Campbell, Esq. of Edmonton, Middlesex, for a collection of Apples, exhibited December 19, 1820.

To Mr. Thomas Blake, Gardener to James Vere, Esq. F. H. S. at Kensington Gore, for the exhibition of a plant of Azalea Indica in flower, February 20, 1821.

To Charles Benham, Esq. F. H. S. for specimens of various Oranges and Lemons from his garden at Isleworth, exhibited March 6, 1821.

To Mr. James Carel, for an Apple of great excellence, which has been named the *Pinner Seedling*, raised in his garden at Pinner, in Middlesex, exhibited April 3, 1821.

LIST OF BOOKS AND OTHER ARTICLES,

PRESENTED TO THE

LIBRARY OF THE SOCIETY,

FROM MAY 1, 1819, TO MAY 1, 1820.

WITH THE NAMES OF THE DONORS.

THE SOCIETY OF ARTS.

Transactions of the Society of Arts, from the commencement. 36 vols. 8vo. *London*, 1783–1818.

Report of the Committee of the Society of Arts, on the Mode of preventing Forgery. 8vo. *London*, 1819.

WILLIAM CATTLEY, Esq. F. H. S.

Hughs's Natural History of Barbadoes. folio. *London*, 1750.

M. JEAN BAPTISTE GODEFROI DELBECQ, C. M. H. S.

Exposition Publique de la Société Royale d'Agriculture, et de Botanique de la Ville de Gand. 8vo. 1818.

AUGUSTUS FREDERICK ADRIAN DIEL, M. D. C. M. H. S.

Diel's Pomology (in German). 21 vols. 12mo.
Frankfort, 1799–1819.

LE CHEVALIER AUBERT AUBERT DU PETIT THOUARS, F. M. H. S.

Cours de Phytologie, ou de Botanique Géuérale. 8vo. Paris, 1819.

Revue Générale des Matériaux de Botanique, &c. 8vo. *Paris*, 1819.

M. CHARLES ROMAIN FEBURIER, C. M. H. S.

Le Bon Jardinier Almanach, pour l'année 1818. 12mo. *Paris*,
With Mss. corrections and additions by M. Feburier.

THOMAS HARE, Esq. F. L. S. &c. Vice-Secretary.

Van Lanteren's Catalogues of Plants, &c. 12mo. *Utrecht*.

Elenchus Plantarum quæ in Horto Lugduno-Batavo coluntur. 8vo. 1818.

Elenchus Plantarum Horti Medici Amstælodamensis. 8vo. 1814.

Catalogue of Horticultural and Agricultural Implements kept for sale at Amsterdam. 8vo. 1814.

ADRIAN HARDY HAWORTH, Esq. F. L. S. &c.

Supplementum Plantarum Succulentarum. 8vo. *London*, 1819.

ROBERT HOLDEN, Esq. F. H. S.

Ellis's Directions for bringing over Seeds and Plants from the East Indies and other distant Countries. 4to. *London*, 1770.

MR. JOHN LINGARD.

A Philosophic and Practical Inquiry into the Nature and Constitution of Timber. 8vo. *London*, 1819.

THE LINNEAN SOCIETY.

Transactions of the Linnean Society, Vol. 12, Part 2.
4to. *London*, 1819.

MESSRS. LODDIGES AND SONS.

The Botanical Cabinet, Parts 25 to 36 inclusive.
8vo. *London*, 1819–1820.

Loddiges' Catalogue of Plants. 12mo. *London*, 1820.

M. LUPIN.

Die Gärten. 12mo. *Vienna*, 1820.

JOHN CLAUDIUS LOUDON, Esq. F. L. S. &c.

Brochieri, Nuovo Metodo, adattato al Clima del Piemonte, per coltivare gli Annanas senza Fuoco. 12mo. *Torino*, 1777.

Elevation of a Curvilinear Pine and Grape Stove. folio.

MR. WILLIAM BRIDGEWATER PAGE, C. M. H. S.

Page's Prodromus of Plants in the Botanical Gardens at Southampton. 8vo. *London*, 1818.

THE MANAGERS OF THE ROYAL INSTITUTION.

The Quarterly Journal of Science and the Arts. Nos. 14, 15, 16, 17. 8vo. *London*, 1819–1820.

THE ROYAL SOCIETY.

Philosophical Transactions of the Royal Society from the year 1812 to the year 1819 inclusive, 17 Parts. 4to.
London, 1812–1819.

JOSEPH SABINE, Esq. F. R. S. &c. Secretary.

Nicol's Forcing, Fruit, and Kitchen Gardener. 4th edition. 8vo.
Edinburgh, 1809.

Pursh, Hortus Orloviensis, or a Catalogue of Plants cultivated in the Island of Orloff, near St. Petersburgh, 12mo. *London*, 1815.

Plenck, Bromatologia, seu Doctrina de Esculentis et Potulentis. 8vo. *Viennæ*, 1784.

Salisbury's (William) Catalogue of the London Botanic Garden.
12mo. *Chelsea.*

Theophrasti Eresii de Historia Plantarum Libri Decem, Græce; cum Syllabo Generum et Specierum Glossario et Notis. Curante Johanne Stackhouse. 2 Parts. 8vo. Oxon, 1813–1814.

Practical and Experimental Inquiry into the Nature and Properties of Manures. 8vo. *Bath*, 1805.

Treatise on the Culture of Potatoes. 12mo. *Launceston*, 1801.

Essay on the Utility of Soap Ashes as a Manure. 12mo.
London, 1812.

Richard's (translated by Lindley) Observations on the Structure of Fruits and Seeds. 8vo. *London*, 1819.

Winchilsea's (Earl of) Letter to the President of the Board of Agriculture on the Advantages of Cottagers renting Land. 4to.
London, 1796.

Report of the Committee of the Board of Agriculture concerning the Culture and Use of Potatoes. 4to. *London*, 1794.

Curtis's Directions for cultivating the Crambe Maritima, or Sea Kale, for the use of the table. 8vo. *London*, 1799.

Tusser's Hundredth good Pointes of Husbandrie (reprinted from the first edition, 1557). 4to. *London*, 1810.

Hints on Vegetation, and Questions regarding the Nature and Principles thereof. 4to. *London*, 1796.

Knight's Doubts relative to the Efficacy of Mr. Forsyth's Plaister. 4to. *London*, 1802.

Bauer (Ferdinand) Illustrationes Floræ Novæ Hollandiæ. Nos. 1 and 2. folio. *London*, 1813.

Kirwan on the Manures most advantageously applicable to the various sorts of soils. Third edition. 8vo. *London*, 1796.

Sinclair's (Sir John) Account of some Experiments to promote the Improvement of Fruit trees by peeling the Bark. 8vo. *London*, 1818.

Blaikie on the Husbanding of Farm-yard Manure. Second edition. 8vo. *London*, 1818.

Hogg's Concise and Practical Treatise on the Growth and Culture of the Carnation, Pink, Auricula Polyanthus, Ranunculus, Tulip, &c. 12mo. *London*, 1820.

Symmons's Hortus Paddingtonensis. 8vo. *London*, 1797.

Banks's (Sir Joseph) short Account of the Cause of the Disease in Corn called by Farmers the Blight, the Mildew, and the Rust. 8vo. *London*, 1805.

Forster's Flora Americæ Septentrionalis, or a Catalogue of the Plants of North America. 8vo. *London*, 1771.

Tupper's Essay on the probability of Sensation in Vegetables. 8vo. *London*, 1811.

Ellis's Inquiry into the Changes induced on Atmospheric Air by the Germination of Seeds, &c. 2 Parts. 8vo. *Edinburgh*, 1807–11.

Archer's Miscellaneous Observations on the Effects of Oxygen on the Animal and Vegetable Systems. Part I. 8vo. *Bath*, 1798.

Account of the Culture of Potatoes in Ireland. 8vo. *Lonaon*, 1796.
Richardson on the Utility of Fiorin Grass. 8vo. *London*, 1811.
Richardson's New Essay on Fiorin Grass, including the History of its Discovery. 8vo. *London*, 1813.
Farish's Treatise on Fiorin Grass. 8vo. *Dumfries*, 1810.
Coyte's Index Plantarum vol. 1. 8vo. *London*, 1807.
Agricultural Surveys of England, Scotland, and Wales. 69 vols. 8vo.

HIS ROYAL HIGHNESS THE GRAND DUKE OF SAXE-WEIMAR, F. H. S.

Models in Wax of Thirty-two Varieties of Potatoes.
Putch's and Bertuch's Monograph of Potatoes (in German). 4to. *Weimar*, 1819.

SIR JAMES EDWARD SMITH, F.R.S. P.L.S., &c.
HONORARY MEMBER OF THE HORTICULTURAL SOCIETY.

Smith's Defence of the Church and Universities of England. 8vo. *London*, 1819.

MR. JOHN TURNER, ASSISTANT SECRETARY.

Duhamel, Traité des Graines, et en particulier du Froment. 12mo. *Paris*, 1753.
Switzer's Ichnographia Rustica; or the Nobleman, Gentleman, and Gardener's Recreation. 3 vols. 8vo. *London*, 1742.

MARTINUS VAN MARUM, M. D. F.M.H.S.

Catalogue des Plantes cultivées au Printems 1810 dans le Jardin de M. Van Marum à Harlem. 8vo.
Catalogue Raisonné des Espèces et Variétés d'Aloes. Par le Prince de Salm Dyck. 8vo.

JEAN BAPTISTE VAN MONS, M. D. F.M.H.S.

Prospectus des Annales Générales des Sciences Physiques. Par MM. Bory de St. Vincent, Drapiez, et Van Mons. 8vo. *Bruxelles*, 1819.

M. PIERRE PHILIPPE ANDRÉ VILMORIN-ANDRIEUX, C. M. H. S.

Le Bon Jardinier Almanach pour l'année 1819. 12mo. *Paris.*

M. FEDERICK VON STETTERHEIM.

Pomologie (in German). 8vo.

CHARLES WORTHINGTON, Esq.

Bonnet's Recherches sur l'Usage des Feuilles dans les Plantes. 4to. *Gottingue,* 1754.

LIST OF BOOKS AND OTHER ARTICLES,

PRESENTED TO THE

LIBRARY OF THE SOCIETY,

FROM MAY 1, 1820, TO MAY 1, 1821.

WITH THE NAMES OF THE DONORS.

THE SOCIETY OF ARTS.

Transactions of the Society of Arts, vol 38. 8vo. London, 1821.

POMOLOGICAL SOCIETY OF ALTENBURG.

A Drawing of the Classification of Apples.

THE MASTER, WARDENS, AND SOCIETY, OF APOTHECARIES OF LONDON.

Field's Memoirs Historical and Illustrative of the Botanic Garden at Chelsea, belonging to the Society of Apothecaries of London. 8vo. *London,* 1820.

MR. WILLIAM BAXTER, F. H. S.

An Engraving of the Pocock Fig-Tree at Oxford.

REV. RICHARD ROUSE BLOXAM, D. D. F. H. S.

Scot (Reynolde) a perfecte Platforme of a Hoppe Garden, and necessarie Instructions for the making and mayntenaunce thereof. 4to. London, 1576, *black letter.*

WILLIAM BULMER, ESQ. F. H. S.

Catalogus Bibliothecæ Historico-Naturalis Josephi Banks. 5 vols. 8vo. *Londini,* 1798.

CALEDONIAN HORTICULTURAL SOCIETY.

Memoirs of the Caledonian Horticultural Society, No. 9. 8vo. Edinburgh, 1819.

A Discourse read at the Annual Election Meeting of the Caledonian Horticultural Society, December 7, 1820. By Andrew Duncan, M. D. 8vo. *Edinburgh*, 1820.

WILLIAM CATTLEY, ESQ. F. L. S. &c. F. H. S.

Digitalium Monographia, cura Johannis Lindley. Folio. *London*, 1821.

WILLIAM COXE, Esq. F. M. H. S.

Eleven Small Drawings of American Apples.

MONS. CHARLES ROMAIN FEBURIER, C. M. H. S.

Notice sur les Rayons Medullaires. 8vo.

THE GEOLOGICAL SOCIETY.

A Geological Map of England by George Bellas Greenough, Esq. with a Memoir.

HENRY GRIMSTON, ESQ. F. H. S.

The Fruit Gardener, 8vo. London, 1768.

Sharrock's History of the Propagation and Improvement of Vegetables. 12mo, *Oxford*, 1660.

ABRAHAM HAWKINS, ESQ. F. H. S.

Drawing of the Agave Americana, which flowered in the open air, in the Garden of James Yates, Esq. at Salcombe, Devonshire.

REV. GEORGE CHARLES LEWIS HEMPEL, C. M. H. S.

Hempel's Magic Ring of Pomona (in German), a new edition enlarged.

DANIEL HILL, M. D. F. H. S.

Hill's Practical Observations on the use of Oxygen or Vital Air in the Cure of Diseases, to which is added a few experiments on the Vegetation of Plants. 8vo. *London*, 1820.

REV. JOHN HILLIARD, F. H. S.

Gerarde's Herball by Johnson. Folio. *London*, 1636.

DAVID HOSACK, M. D. F. M. H. S.

Hosack's Observations on Febrile Contagion, and on the means of Improving the Medical Police of the City of New York. 8vo. 1820.

Memoirs of the Board of Agriculture of the State of New York. Vol. 1. 8vo. *Albany*, 1821.

THE BARON JOSEPH FRANCIS JACQUIN, F. M. H. S.

Schott's List of Plants in the Brasils (in German). 8vo.

Jacquin Ueber den Ginkgo. 8vo. *Wien*, 1819.

HENRY BELLENDEN KER, ESQ. F. H. S.

Strelitzia Depicta, or Coloured Figures of the known Species of the Genus Strelitziá, from Drawings by Francis Bauer. Large folio. *London*, 1818.

MR. PETER LINDEGAARD, C. M. H. S.

Lindegaard's New Method of Forcing Grapes. 8vo. *London*, 1817.

JOHN LINDLEY, ESQ. F. L. S. &c. F. H. S.

Rosarum Monographia, or a Botanical History of Roses. 8vo. *London*, 1820.

Icones Plantarum spontè Chinâ nascentium è Bibliothecâ Braamianâ excerptæ. Folio. *London*, 1821.

THE PROPRIETORS OF THE LITERARY GAZETTE.

The Literary Gazette for the year 1820. 4to. *London*.

JOHN LIVINGSTONE, ESQ. C. M. H. S.

Statement of the objects of the Anglo-Chinese College at Malacca. sm. 4to. *Malacca*.

MESSRS. LODDIGES AND SONS.

The Botanical Cabinet, Part 37–48 inclusive. 8vo. *London*, 1820–21.

THE UNIVERSITY OF OXFORD.

Lister, Historia Conchyliorum. Editio Altera. Fol. *Oxonii*, 1770.

Stackhouse, Illustrationes Theophrasti. 8vo. *Oxonii*, 1811.

MR. FREDERIC OTTO, C.M.H.S.

Icones Plantarum Selectarum Horti Regii Botanici Berolinensis, cum Descriptionibus et Colendi Ratione, Auctoribus H. F. Link, Directore, et F. Otto, Inspectore Horti. Fasciculus 1 et 2. 4to. *Berolini*, 1820.

LE CHEVALIER JOSEPH PARMENTIER, C.M.H.S.

Parmentier, Exposé Succinct des Produits du Règne Vegétal et Animal dans le Canton d'Enghien. 8vo. *Bruxelles*, 1819.

Catalogue des Arbres et Plantes cultivés dans les Jardins de M. Joseph Parmentier. 8vo. *Bruxelles*, 1818.

Brotero, Flora Lusitanica, Pars 1 et 2. 8vo. *Olesipone*, 1804.

SIGNOR ANTONIO PICCIOLI, C.M.H.S.

Pomona Toscana, No. 1.

Six Models of Lemons and Oranges, to which the preceding refers.

MONS. CHARLES FRANCOIS PIERARD, C.M.H.S.

Pierard, Notes sur le Saugier ou Poirier de Sauge. 8vo. *Paris*, 1820.

MR. JOHN LEWIS RANSLEBEN, C.M.H.S.

Tracts on Gardening (in German). 8vo. *Berlin*, 1811.

MR. JOHN ROBERTSON, F.H.S.

Van Oosten's Dutch Gardener, or the Compleat Florist. 8vo. *London*, 1711.

Practical Observations relative to the County of Kilkenny, made in the years 1800-1801. 8vo. *Dublin*, 1802.

MR. WILLIAM ROSS, F.H.S.

Rea's Flora, or a Complete Florilege, furnished with all requisites belonging to a Florist. Folio. *London*, 1665.

THE MANAGERS OF THE ROYAL INSTITUTION.

Journal of Science and the Arts, Nos. 18, 19, 20, and 21. 8vo. *London*, 1820-21.

THE ROYAL SOCIETY.

Philosophical Transactions of the Royal Society of London for the year 1820, 2 Parts. 4to. *London*, 1820.

JOSEPH SABINE, ESQ. F. R. S. &c. SECRETARY.

Jenkins's Hortus Marybonensis, 12mo. *London*, 1819.

A Letter to Sir Humphry Davy, Bart. on his being elected the President of the Royal Society. 8vo. *London*, 1821.

R. A. SALISBURY, ESQ. F. R. S. &c.

Pencil Drawing of Disandra Prostrata.

Ditto of Centaurea Amberboi.

Ventenat Decas Generum Novorum aut parum Cognitorum. 8vo. *Paris*, 1808.

CLAUDE SCOTT, ESQ. F. L. S. F. H. S.

Ehret Plantæ Selectæ. Folio, 1773.

SIR JAMES EDWARD SMITH, F. R. S. &c. P. L. S.

HONORARY MEMBER OF THE HORTICULTURAL SOCIETY.

Smith's Grammar of Botany, illustrative of the Artificial as well as Natural Classification. 8vo. *London*, 1821.

MONS. ANDRÉ THOUIN, F. M. H. S.

Thouin, Instruction sur l'Etablissement des Pepinières. 8vo.

——— Notes sur les Semis du Pin de Riga. 8vo.

——— Note sur la Culture et les Usages du Pin Laricio de Corse. 8vo.

CHARLES PETER THUNBERG, M. D. F. M. H. S.

Thunberg Dissertationes Academicæ, 3 vols. 8vo. *Gottingæ*, 1799.

——— De Nutritione Plantarum. 4to. *Upsaliæ*.

——— Beskrifning på Svenske Djur. Första Classen, om Mammallia. 8vo. *Upsala*.

——— Omhtlandskf Trad, Buskar och Blomster Vaxter, som Kunna rala Svenska Klimater. 4to. *Upsala*.

——— Om Hackars Plantering till Lefvande Gardes-Garder. 4to. *Upsala*.

——— Dissertatio de Daphne. 4to. *Stockholmiæ*, 1820.

MR. JOHN TURNER, F. L. S. ASSISTANT SECRETARY.

Phillips's Pomarium Britannicum. 8vo. *London*, 1820.

Persoon's Synopsis Plantarum. 2 vols. 12mo. *Paris*, 1807.

Munting De Vera Antiquorum Herba Britannica, &c. 4to. *Amster*. 1681.

Hales's Vegetable Staticks. 8vo. *London*, 1727.

MONS. PIERRE PHILLIPPE ANDRÉ VILMORIN-ANDRIEUX, C. M. H. S.

Le Bon Jardinier Almanach avec Supplément pour l'Année, 1820. 12mo. *Paris*, 1820.

WALTER WADE, M. D.

Wade Catalogus Systematicus Plantarum Indigenarum in Comitatu Dublinense. Pars Prima. 8vo. *Dublin*, 1794.

——— de Buddlia globosa et Holco odorato. 4to. 1804.

——— Plantæ rariores in Hibernia inventæ. 8vo. *Dublin*, 1804.

——— Salices, or an Essay towards a General History of Sallows, Willows, and Osiers. 8vo. *Dublin*, 1811.

——— Sketch of Lectures on Artificial or Sown Grasses. 8vo. *Dublin*, 1808.

——— On Quercus, or Oaks; from the French of Michaux. 8vo. *Dublin*, 1809.

——— Hortus Medicus, or Medicinal Division in the Dublin Society's Botanical Garden. 4to. *Dublin*, 1813.

——— Hortus Gramineus Glasnevinensis, or the Glasnevin Grass Garden. 4to. *Dublin*, 1818.

——— Pecudarium, or Cattle Division in the Dublin Society's Botanical Garden. 4to. *Dublin*.

——— Prospectus of the Arrangement in the Dublin Society's Botanical and Agricultural Garden at Glasnevin. 12mo. *Dublin*, 1818.

——— Prospectus of Lectures on Botany. 8vo. *Dublin*, 1820.

ROGER WILBRAHAM, ESQ. V. P. H. S.

Donn Hortus Cantabrigensis. 12mo. *Cambridge*, 1796

MR. NATHANIEL JOHN WINCH, F. L. S.

Winch's Essay on the Geographical Distribution of Plants through the Counties of Northumberland, Cumberland, and Durham. 8vo. *Newcastle*, 1819.

INDEX.

Aerides, on their treatment, 241.
Agave Americana, notice relative to the flowering of, in the open air, 389.
AITON, WILLIAM TOWNSEND, Esq. notice of a late Nectarine raised in the Royal Gardens at Kew, 211.
AITON, JOHN TOWNSEND, Esq. 531.
Alexander Apple, notice respecting its culture, 524.
Alexandrian Ciotat Grape, account of a new seedling variety so called, 8.
Alfriston Apple, 218.
Almond, particulars relative to the varieties of, 408, 9.
Aloe. See *Agave Americana*.
Amaryllis, description of the pollen of, 34.—*Reginæ vittata*, 40.—On the production of a Hybrid one, 498. *Josephinæ—pallida—Belladonna minor—reticulata*, 181, *note*. —*Johnsoni*, account of its origin, 501.
America, North, notice of esculent vegetables used there, 443, *et seqq*.
ANDERSON, Mr. DAVID, notice of a Plum exhibited by, 207.—His account of a new Melon, 318.
ANDERSON, Mr. JOHN, account of a new esculent vegetable, called Tetragonia, or New Zealand Spinach, 488.
ANDREWS's *Roses*, cited, 288, 290.
Anemone, on the cultivation of the, 374.
Annales d'Agriculture, cited, 488.
Anthemis grandiflora, &c. 326, 7.
Apios tuberosa, 445.
Apothecaries' Company, notice of a clause in the deed of conveyance of the Chelsea Garden, 332, *note*.
APPLES, account of some of the best Norfolk varieties, 65.—Notices of various sorts of, exhibited to the Society, 216, 219.
Apricot, notice of a seedling from the Moor Park Apricot, 207.—Conjecture respecting the native country of the Apricot, 368, *note*.
Aquatic and *Bog* plants, account of a successful mode of managing them, 395.
ARRAN, Earl of, account and description of a hollow wall in his gardens at Bognor, 244.
Astrachan Apple, 522.
ATHOLL, Duke of, account of five kinds of Larch sent by, to the Society, 416.
ATKINSON, WILLIAM, Esq. specimens of Apples exhibited by, 522.
Aubletia Tibourbon, result of an experiment in ringing its bark, 128.
AUSTIN, Mr. ROBERT, a cultivator of the Double Scotch Rose, 286, 303.—Communications from, on the Ayrshire Rose, 456.
AYRES, Mr. RICHARD, his account of the management of the plants of the Genus Citrus, 306, *et seqq*.
Ayrshire Rose. See *Rose*.
Azaleas, American, remarks on, 24.
Azalea Indica, notices of a mode of treating it, 132,

B.

Babiana, errors repecting, noticed, 19.
BACON, Lord, cited, 224, 5.
BAKER, WILLIAM, Esq. specimens of an Apple sent by, 528.
BALDWIN, Mr. THOMAS, his plan for forcing Sea Kale, without covering the crowns of the plants with dung or litter, 63.—His treatise on the culture of the Pine Apple, cited, 75, 8.
Banks Lady, account of the Rose named in honour of, 170, *et seqq*.
BARR and BROOKS, Messrs. Chrysanthemums introduced by, 333, 339, 354.
Baxter's Pearmain, 67.
BAXTER, Mr. WILLIAM, his experiments in ringing the bark of plants, 128.
Bayford Bury Pippin, 528.
BEAUCHAMP, GEO. Esq. specimens of a Walnut sent by, 517.

Begonia Evansiana, notice respecting its culture, 407.
Bellardi, Carlo, 261.
Belle-Bonne Apple, 68.
Bellefleur d'Eté Apple, 278.—*Longue, ib.*—*Oblongue*, 279.
Berberis vulgaris, notice of a variety of, 407.
Blake, Mr. Thomas, his method of treating the *Azalea Indica*, 132.—His method of propagating choice Dahlias by grafting their shoots, on the tubers of the roots of more common kinds, 476.
Blancard, M. of Marseilles, Chrysanthemums introduced by, 333.
Boileau, Lieut. notice of a Cucumber sent by him from Napal, 136.
Bonne Malinaise Pear, 276.
Borrer, Mr. William, 466.
Bossom Apple, 528.
Botanic Garden, at Chelsea, clause in the deed of conveyance from Sir H. Sloane, 333.
Botanical Cabinet, cited, 46, 260.
Botanical Magazine, cited, 22, 31, 34, 38, 44, 50, 171, 179, 259, 260, 260, 327, 335, 337, 9, 407, 422, 457, 461, 464, 500, 553, 563.
Botanical Register, cited, 30, 38, 45, 171, 181, 259, 260, 327, 339, 503.
Botanical Repository, cited, 390.
Bradbery, Mr. William, account of his mode of cultivating the Water Cress, 537.
Braddick, John, Esq. notice of a Grape exhibited by him, 54.—Of a mode of preserving Grapes, 143.—Notice of a Peach raised by, 209.—Method of grafting adopted by, 410.—Flat Peach of China exhibited by, 512.—Specimens of the Seckle Pear exhibited by, 520.
Brand, Hon. Thomas, notice of two bottle Gourds grown in his garden at the Hoo, 52.
Brassica Washitana, 444.
Bree, Rev. William Thomas, notice of specimens of an Apple exhibited by, 219.
Breynius, cited, 329.
British Gardener's Director, cited, 11.
Broccoli, Cape, method of growing, 559.
Brooks, Mr. Charles, notice of an Apple, exhibited by, 217.
Brookes, Mr. Samuel, notice by, relative to the flowering of Lilium Japonicum, 551.
Brooks's Apple, 216.
Brotero, Professor, 259, 260.
Brown, Mr. Robert, his account of the origin of the Double Scotch Rose, 285.
Brown, Mr. James, on a span-roofed Peach-house, 562.
Brunsvigia. See *Nerine*.
Buck, Mr. William, notice of a Pit for fruiting Pines and Melons, 533.—Vines in pots, exhibited by, 560.
Buda Kale. See Kale.
Buds of fruit trees, directions for preserving them in a vegetating state, 403.
Bulbs, on the cultivation of those from the Cape, 153, *et seqq*.
Busch, Mr. Joseph, his observations on a method of training fruit trees in Russia, to preserve them from frost, 405.—Notes by, on Horticultural subjects, 568.

C

Cabbages, mode of protecting them from the Butterfly, 569.
Call, Mr. Martin Miller, his description of the Steam Pits in the Taurida Gardens at St. Petersburg, 468.
Caloma, Comte de, 274.
Campbell, Dr. Charles, 423.
Campbell, Charles, Esq. an account of a method of planting Vines in his garden at Edmonton, 4.
Capron, Mr. Hasler, notice of specimens of an Apple exhibited by, 218.
Capsella bursa pastoris, 444.
Carey, Dr. information from, respecting a variety of *Crinum*, 422, 3.
Carnation, Dwarf, account of, 556.
Caroline Apple, 66.
Carrel, Mr. James, specimens of an Apple exhibited by, 530.
Carrots, Garden, description and account of the different varieties of, 383.
Casuarina (acida), notice of specimens of, sent to the Society by the Duke of Saxe Weimar, 58.
Casuarina equisetifolia, 56.
Caterpillars, notice of a mode of destroying those of the *Phalæna brumata*, 135.—Mode of protecting Cabbages from, 569.
Cato *de re rustica*, cited, 495.
Cattley, William, Esq. his account of a new Psidium, 315

Celeriac, notice of several roots exhibited, with description of its culture, 57.
CHAPMAN, Mr. ROBERT, his account of the cultivation of the *Passiflora quadrangularis*, 60.
Charcoal, its effects on a Hyacinth root, 130.
Charles d'Autriche Pear, 521.
Chenopodium album, 489.
Cherries, instructions for forcing them, 117.
CHRISTIE, Mr. WILLIAM, his account and description of the varieties of autumn and winter Radishes, 10.—Description and account of the different varieties of the garden Carrot, 383, *et seqq*.
Chinese, their method of dwarfing shrubs and trees, and of propagating from branches, 224, *et seqq*.—Their mode of distorting the human form, 228, *note*.
Chrysanthemum Indicum, LINN. difference between that and the Chinese Chrysanthemum, 326, *et seqq*.
Chrysanthemums, Chinese, account of the varieties of cultivated in England, 320, *et seqq*.—On the cultivation of, 571.
Ciotat Grape, Alexandrian, account of a new seedling variety so called, 8.
Citrus, on the management of the plants of that genus, in the garden of EDWARD MILLER MUNDY, Esq. 307, *et seqq*.
Citron, Madras, notice of a specimen of, 417.
Clay, observations on its effects in combustion when united with coal, 157,8.
Coburgia. See *Nerine*.
Cocks-comb, on the cultivation of, 321.
COLVILL, Messrs. Chrysanthemums flowered by them, 335, 352.
COLUMELLA, cited, 495.
Convolvuli, remarks on some, 22, 26.
COOPER, Mr. JOSEPH, gardener to Lord MILTON, 32.
Corn, dwarf Indian, notice of heads of grown in the Society's garden, 53.
CORNATO, Prince, cuttings of the Zante Grape, sent by him, 515.
Cortice Striato Apple, 278.
CORREA DE SERRA, M. JOSEPH, notice by, respecting several esculent vegetables, 443, *et seqq*.
COTTON, Miss, her drawing of *Lilium Japonicum*, 551.
Court-pendu plat rougeâtre Apple, 279.
COWPER, Earl, notice of a method of preserving Grapes, in his garden, 132.
Cranberry, American, on the cultivation of, in dry beds, 483.
CRESSWELL, JOHN, Esq. notice of a mode of treating the *Azalea Indica* in his garden, 133.
Crinums, remarks on, 24, 5, 34, 5. *et seqq*.
Crinum revolutum, 182, *note*.—*Amabile*, notice relative to the management of, 419.—*Superbum*, 422-5.—*Augustum*, 424.
Cucumber, account of one grown in Napal, 136.—Mode of obtaining Cucumber plants, for the winter crop, 411.—On a method of raising early ones, 453.—Account of two specimens of one sent to the Society, 560.
Cucurbita lagenaria, notice of the fruit of exhibited, 52.
CULLUM, Rev. THOMAS GERY, on the construction of piers and copings of garden walls, 269.
Currant bushes, mode of protecting them from the fly, 568.
Currants, notice of new varieties of, 206.—Method of forcing them, 415.
CUSHING's *Exotic Gardener*, cited, 484.

D.

DACRE, Lord, his gardener's method of training Gooseberry bushes, 194.
Dahlias, on a method of propagating choice ones, by grafting, 476.
DAVIES, Rev. W. W. notice of Strawberries exhibited by, 508.
DAVY, Sir HUMPHREY, 78, 158.
DAWSON, Mr. JOHN, notice of Fruits of the Banana tree sent by him to the Society, 137.
DE CANDOLLE, *Plantes Grasses*, cited, 491.
Decortication. See *Ringing*.
Dendrobia, on their treatment, 241.
DESFONTAINES's *Histoire des Arbres*, cited, 326.
DIEL's Treatise on Apples and Pears, cited, 523.
DOBREE, HARRY, Esq. specimens of an Apple sent by, 524.
DON, Mr. DAVID, his Botanical character of the Ayrshire Rose noticed, 457.
Doucin, description of the Stock, so called by the French, 411.

Douglas, Mr. George, communications from, on the Ayrshire Rose, 456,7.
Downton Strawberry. See *Strawberry*.
Dubreuil, M. communication from, on the different sorts of Stocks, 566.
Dung, notice of the superior advantages of it fresh, in the culture of vegetables, 55.
Dutch, their mode of growing Hyacinths, 163, 4.
Dutch Queening, 71.—*Mignonne*, 70.
Dwarfing of trees and shrubs, how effected by the Chinese, 227.

E.

Echites suberecta, remarks on, 23.
Edinburgh Phil. Magaz. cited, 456.
Edwards, John, Esq. notice of a Pine Apple presented by, to His Majesty, 555.
Egremont, Earl of, mode of forcing Cherries in his garden at Petworth, 116.
Evans, Thomas, Esq. Chrysanthemus introduced by, 333.

F.

Fall Pippin, 217.
Fig trees, on the treatment of, 185.—On their culture in the stove, 200.—On the management of in the open air, 428.—Account of standard ones, 504.
Figs, dried, specimens of exhibited, 564.
Filbert, on the cultivation, and mode of pruning of, near Maidstone, 145.
Fischer, Dr. his notice on the culture of *Begonia Evansiana*, 407.
Flanagan, Mr. Patrick, a practical account of the culture of early Melons, 187.—Specimens of an Apple exhibited by, 524.—Account of a Cucumber raised by, 560.
Flora Peruviana, 44.—*Japonica*, 176, 491, 552.—*Carniola*, cited, 461.
Flore Françoise, cited, 462.
Flues of hot-houses. See *Hot-houses*.
Forcing Pit, description of an improved one, 220, *et seqq*.
Forster Prodromus Flor. Insul. Austral. cited, 490.
Fouldon Pearmain, 69.
Frankland, Sir Thomas, on the means of destroying Wasps, 107.—On the effect of charcoal on Hyacinth roots. 130.—Melon sent by, to the Society, 514.
Fruit trees, on the managing of, in pots, 439.
Fruits, notices of new or remarkable varieties of, 203, *et seqq.*; 508.
Fry, Dr. notice of an Apple raised by, 525.
Fuel, on the most economical method of employing it in heating flues, 156.

G.

Galton, Samuel, Esq. description of his plan of exposing the branches of Vines, 567.
Garnier, Rev. Thomas, observations on the cultivation of Strawberries, 479.—Specimens of, sent by, to the Society, 509.
Gas, ammoniacal, destroys insects, 78.—Oxygen, its effects on an Orange tree, 133.
Genus, its definition, 21.
Geraniums, method of preserving them during the winter, 414.
Gerard's Herbal, cited, 11.
Gourds, bottle, notice of two, 52.
Gladioli, African, and European, remarks on mule productions of, 23, 39.—On the culture of the African, 153.
Glazing of hot-houses, observations on the, 84, *et seqq*.
Glout Morceau Pear, 276.
Golden Noble Apple, 524.
Goose, Mrs. 69.
Gooseberry bushes, on a new method of training them, 194.—Wilmot's early, and late varieties, 206, 7.—Method of forcing Gooseberries, 415.—Mode of protecting them from the fly, 568.
Gore, Col. his mode of building garden walls, 95.
Gowen, James Robert, Esq. observations of the method of glazing hot-houses, recommended by him, 84, *et seqq*.—On the production of a Hybrid Amaryllis, 498.
Granadilla, on the cultivation of, 60.
Grange, Mr. James, notice of Strawberries exhibited by, 508.
Grape, account of a new seedling variety, the Alexandrian Ciotat, 8.—Notice of one exhibited by Mr. Braddick, 54.—Kishmish, 212.—Petersburg, 213.
Grapes, in Vineries, on their management, 98.—Notice of a method of preserving Grapes,

131, 143.—Notice of varieties of, 212.—Mode of obtaining an early crop, in the Pine Stove, 415.
Gravenstein Apple, 216, 523.
Green Pear of Yair, 214.
Gregson, Mr. Isaac, 319, *note*.
Greville, Hon. Robert Fulk, notice of a Madras Citron sent by, to the Society, 417.—Notice of a Pine and Melon Pit in his garden, 533.
Griffin, Mr. William, on the management of Grapes in Vineries, 98, *et seqq*.
Griffin, William, Esq. his mode of cultivating Lilium Japonicum, 554.
Guernsey Lily, on the culture of, and other bulbs, 176, *et seqq*.
Gunter, Mr. Robert, his account of the effect of steam, as a bottom heat, on Pine plants, 408.
Gwydir, Lord, introduced the Double Scotch Rose from Perth, 286.

H.

Hague, Mr. account of a steam apparatus invented by, 434.
Hallett, Robert, Esq. on the cultivation of the American Cranberry in dry beds, 483.
Hanbury, William, Esq. his gardener's method of managing Vines, 246, *et seqq*.
Hammond, James, Esq. specimens of a Melon sent by, 514.
Hanwell Souring Apple, 219.
Hare, Sir Thomas, his gardener's mode of cultivating early Melons, 187.
Harewood, Earl of, account of the cultivation of the *Passiflora quadrangularis*, in his Lordship's garden, 60.
Harrison, Mr. Charles, his account of the produce of the Peach trees in the garden at Wortley Hall, since the year 1808, inclusive, 79.—Specimens of a Seedling Grape sent by, 516.
Harvey Apple, 67.
Haus Mutterche Apple, 278.
Hawkesworth's Voyages, cited, 489.
Hawkins, Abraham, Esq. notice relative to the flowering of the *Agave Americana*, in the open air, 389.
Hay, Mr. James, his mode of obtaining an early crop of Grapes in the Pine Stove, 415;—and of forcing Gooseberries and Currants, *ib*.
Hayward, Mr. Joseph, his account of a Steam Apparatus, 435.
Heaths (Ericæ), remarks on, 27.
Hemp, protects Cabbages from the butterfly, 569.
Hempel, Rev. Mr. his account of the effects of ringing the bark, 557.
Heyne, Dr. *Crinum amabile* introduced by, 424.
Herbarium Amboinense, cited, 335.
Herbert, Hon. and Rev. William, on the production of Hybrid vegetables; with the result of many experiments made on the investigation of the subject, 15, *et seqq*.—On the culture of the African Gladioli, and other Cape bulbs, in the open borders, 153, *et seqq*.—On the culture of Hyacinths, 163.—On the culture of the Guernsey Lily, and other bulbs, 176, &c.—On the treatment of parasitical plants, 241.
Hill, Dr. account of his successful application of oxygen gas to an Orange tree, 134.
Hogg, Mr. Thomas, on the cultivation of Pinks, 451.
Hogg, Mr. Walter, his mode of treating Pine Apple Plants of extraordinary size, 555.
Holden, Robert, Esq. his description of a skreen for protecting wall trees, 93,4.
Holford, Charles, Esq. his mode of fastening trees to walls, 569.
Hooker, William, Esq. his description of a mode of growing Pines, 363.
Horrex, Mrs. 69.
Horsham Russet, 69.
Hortus Kewensis, cited, 172, 285, 303, 327, 330, 336, *et seqq*., 489.—*Malabaricus*, cited, 335.—*Cantabrigiensis*, cited, 422.—*Monspeliensis*, cited, 462.—*Demidov*. cited, 490.
Hot-houses, observations on the glazing of, 84.—On the most economical mode of heating the flues of, 156.—Mr. Walker's improved construction of the flues of, 237.
Howison, Dr. 226, 230.
Hoya carnosa, its property of attracting insects doubted, 108.
Hubbard's Pearmain, 68.
Hume, Sir Abraham, his account of a plant of the *Magnolia conspicua*, 59.—Chinese

Chrysanthemums introduced by, 333, 338, 341, 343-7.
HUNT, THOMAS, Esq. result of his experiments in ringing the bark of fruit trees, 125, 564. —Specimens of an Apple sent by, 525.
Hunt's Duke of Gloster Apple, 525.
Hyacinths, on the culture of, 163.—Waterloo, notice of Flowers of, 413.
Hybrid Vegetables, on the production of, 15, *et seqq.*—Observations on, 377, *et seqq.*
Hydrangea Hortensis, mode of turning it blue, 568.
Hydrophyllum Virginicum, 445.

I. J.

JACQUIN, Baron, notice of a variety of the Common Berberry, 407.
JACQUIN'S *Fragmenta Botanica*, cited, 282, 461.
JAMES, Mr. THOMAS, his mode of growing Onions, 130.
JEEVES, Mr. STEPHEN, notice of two Bottle Gourds, exhibited by him, 52.—On a new method of training Gooseberry bushes, 194, *et seqq.*
JENKINS, Mr. mode of growing Pines in his garden, 363.
JENKINS, EDWARD, Esq. mode of cultivating Mushrooms in his garden, 472.
Indian corn, dwarf, notice of heads of grown in the Society's garden, 53.
Insects, receipt for a wash for destroying those on fruit trees, 143.
JOHNSON, Mr. the propagator of the *Amaryllis Johnsoni*, account of, 501.
JONES, Sir HARFORD, 75.
Journal of Science and the Arts, cited, 422, 428.
Journal d'Histoire Naturelle, cited, 326.
JUDD, Mr. DANIEL, his account of an improved method of planting Vines for forcing, 4.
Julien, Early, Apple, 216.
Ixia, seminal varieties of, erroneously considered as distinct, 19.

K.

KÆMPFER, cited, 332, 552.
Kale, Sea, plan for forcing, 63.—*Buda*, a new mode of growing it, 570.
KEENS, Mr. MICHAEL, Hudson's Bay Strawberry exhibited by 205.
KER, HENRY BELLENDEN, Esq. his account of the mode of cultivating the Water Cress, 537, *et seqq.*
KIRKE, Mr. JOSEPH, specimens of a Peach exhibited by, 513.
Kishmish Grape, 212.
KENNARD, Mr. JAMES, account of his Fig garden, 504.
KNEVETT, Mr. SAMUEL, specimens of Pears exhibited, by 518.
Knobby Russet, 219
KNIGHT, T. A. Esq. upon the means of giving strength to the stems of plants growing under glass, 1.—On the culture of the Pine Apple, without bark or other hot-bed, 72. *et seqq.* —On the most economical method of employing fuel in heating the flues of hot-houses, 156.—Physiological remarks on the effects of partial decortication, or ringing, on fruit trees, 159, *et seqq.*—Further particulars of the Downton Strawberry, 197.—On the culture of the Fig tree in the Stove, 200, *et seqq.*—Notice of a Peach raised by, 210.—On the cultivation of the Cocks-comb, 321. —Observations on Hybrids, 367. Directions for preserving Buds of Fruit trees in a vegetating state, 403.—Upon pruning and training the Plum tree, 426.—On the managing of Fruit trees in pots, 439.—On a mode of raising early Potatoes, 447.—On grafting the Vine, 495.—Specimens of Cherries, sent by, 510;—and of Pears, 521.— —On the culture of the Pine Apple, 543.
Krijgs Poire, 277.

L.

LABILLARDIERE, cited, 58.
LAMBERT, AYLMER BOURKE, Esq. specimens of the fruit of the Trapa Natans, exhibited by, 563.
Laps used in glazing hot-houses, 90,1.
Larch, account of five kinds of, 416.
LAWRENCE'S *Roses*, cited, 303.
LAWRENCE'S *Gentleman's Recreation* cited, 432.
LE COUTEUR, Major Gen. specimens of an Apple sent by from Jersey, 525.
LEE, Mr. his cultivation of Double Scotch Roses, 286 303.—Of Chinese Chrysanthemums, 340.

LEE and KENNEDY, Messrs. Chrysanthemums grown by, 337.
Lemon trees, account of, in the open ground at Salcombe, 142.
Leopoldia reticulata, 181.
Lilium Japonicum, notice relating to the flowering of, 551.
LINDLEY, Mr. GEORGE, his account of some of the best varieties of Apples peculiar to, or cultivated in Norfolk, 65.
LINDLEY, Mr. JOHN, his drawing and description of a Hybrid Passiflora, 261.—His *Monographia Rosarum*, cited, 281, 458, 464.—Notes by, on five kinds of Larch, 416.
LIVERPOOL, Earl of, mode of growing Spanish Onions in his garden at Walmer Castle, 139.
LIVINGSTONE, JOHN, Esq. account of the Chinese mode of dwarfing Shrubs and Trees, including their plan of propagating from branches, 224, *et seqq.*
LOCKNER, Capt. JOHN CHRISTOPHER, 339.
LODDIGES, Mr. GEORGE, his description of a steaming apparatus, 56.—Result of his experiments in ringinging the bark of Passifloras, 120.
LONG, Rt. Hon. Sir CHARLES, management of the *Crinum amabile* in his garden, 419.
London Pippin, 67.
LOUDON, Mr. his substitute for putty in glazing hot-houses, 90.
LOUDON, JOHN, Earl of, the Ayrshire Rose first raised in his garden, 457, 463.
LOWD, Mr. THOMAS, notice of his Fig garden, 506.

M.

MACFARLANE, Mr. JOHN, specimens of Cherries exhibited by, 511.
MAC LEAY, ALEXANDER, Esq. 135, 6.
MAC LEOD, Mr. DANIEL, his method of growing Cape Broccoli, 559.
MACPHAIL *on the Cucumber*, cited, 187, *note*.
Magic Ring of Pomona, notice of the second edition of, 557.
Magnolia conspicua, account of a plant of, grown in the garden of Sir ABRAHAM HUME, 59.
MAHER, Mr. JOHN, notice of a method adopted by him to protect young vegetables from the effects of excessive heat, 51.—On the treatment of standard Fig trees, 185.
Maïs à Poulet, 53.
MALCOLM, Mr. WILLIAM, one of the first cultivators of Double Scotch Roses, in England, 286.
Marie Louise Pear, 519.
MARSLAND, PETER, Esq. notice of a Queen Pine grown by him, 52.—Account of a mode of treating Pine Plants, so as to make them produce fruit within the year, 392.
Matricaria Japonica, and *Indica*, 329, 331.
MEARNS, Mr. JOHN, account of a method of managing Vines in a common Grapery, 246.—of obtaining Cucumber plants for a winter crop, 411.
Melons, Early, a practical account of their culture, 187, *et seqq.*—Notice of a variety called the *Dampsha*, 211.—Account of the Montagu Cantaloup, and the method by which it was obtained, 318.
MILLER's Gardener's Dictionary, cited, 11, 282, 285, 331.
MILLS, Mr. JAMES, plan of a hot-wall exhibited by him, 139.
Models, in wax, of the most approved fruits grown in Germany, a collection of, presented to the Society by the Grand Duke of Saxe-Weimar, 51.
MILNE, Mr. THOMAS, account of a Hybrid Passiflora raised by, 258.
MOENCH's *Supplementum*, cited, 327.
Molina's Natural History of Chili, cited, 54.
Mollet's Guernsey Pippin, 524.
MONS, Dr. VAN, a successful cultivator of Fruits, 274, 5.
Montagu Cantaloup Melon, 320.
MORGAN, Mr. WILLIAM, notice of a Seedling White Currant raised by, 206.—Of a Seedling Plum, 208.
MORRISON, Dr. 227.—Information obtained from, respecting the propensity of the Chinese to distort the human form, 228, *note*.
Moths, notice of a mode of destroying those of the *Phalæna brumata*, 135.
Mule vegetables, remarks on their production, 41, 43, 47.—Singular instance of a Mule bird, 372.
MUNDY, E. M. Esq. on the management of the plants belonging to the Genus Citrus in his garden, 306

Musa Sapientum, 138.
Mushrooms, an account of the cultivation of, 472.

N.

Nails, for fruit walls, 418.
NAIRN, Mr. JOHN, notice of an *Azalea Indica* exhibited by him, 133.
Napoleon Pear, 215.
Nectarine, Pitmaston Orange, 232, 3.
Nectarines, varieties of exhibited, 210,11.
NEILL, PATRICK, Esq. his account of the Ayrshire Rose, noticed, 456, 7.
NEPEAN, Sir EVAN, his zeal in sending plants of the Poonah Vine to Europe, 516, 17.
Nerine, on the culture of bulbs of that genus, and of *Coburgia* and *Brunsvigia*, 176, *et seqq.*
NOEHDEN, Dr. notice of specimens of a *Casuarina*, sent by him to the Society, 58.—Remarks on Mr. Harrison's statement of the produce of the Peach trees at Wortley Hall, 82.—His review of the second edition of Hempel's *Magic Ring of Pomona*, 557.
NOISETTE, M. his description of the different kinds of Stocks, 411.
NORFOLK, Duke of, treatment of standard Fig trees in his garden at Arundell Castle, 185.
NORTHAMPTON, Marquis of, mode of growing Onions by his gardener at Castle Ashby, 138.—Description of a Forcing Pit, in the garden there, 220.
Notices of Communications to the Society, between Nov. 1818, and May 1819, of which separate accounts have not been published, 51.—Between May, 1819, and February, 1820; 130.—Between February and August, 1820.—Of new or remarkable varieties of Fruits, 203, *et seqq.*—555, *et seqq.*

O.

OLDAKER, Mr. ISAAC, on the treatment of the Neapolitan Violets, so as to make them produce a succession of flowers through the winter, 109, *et seqq.*—Notices on the proper method of treating the *Rosa Banksiæ*, 173.—Notice of the Cocks-comb Pine Strawberry exhibited by him, 205.—Notice of the *Dampsha* Melon grown by, 211;—of varieties of Grapes, 212;—Of specimens of the Welbeck Seedling Pine, 213.—On the management of the Roseberry Strawberry, 234.—Specimens of Grapes exhibited by, 515,16.
Onions, notice of a successful mode of growing them, 130, 31.—Mode of growing them of a large size, 138.—Spanish, notice of some grown at Walmer Castle, 139.—Observations on the varieties of, 410.
Orange trees, account of the recovery of one by the application of oxygen gas, 133.—Account of some at Salcombe, 142.
Orangefield Rose. See ROSE.
Order, its definition, 21.
Oxalis glandulitegia, 33.

P.

PALLMER, CHARLES NICHOLAS, Esq. plan suggested by him, for bringing seeds from distant countries, 57.—Mango seeds given by him to Mr. Knight, 73.
PALMER, THOMAS, Esq. 340.
Pancratium Amboinense, remarks on, 31, 34.
Pancratiums, remarks on their Hybrid production, 30, *note*, 31, 34.
Paradisus Londinensis, cited, 33.
Parasitical plants, on the treatment of, 241.
PARKER, THOMAS NETHERTON, Esq. specimens of an Apple sent by, 526.
Passiflora quadrangularis. See *Granadilla.*—*Laurifolia*, 62.—*Incarnata*, result of an experiment in ringing its bark, 129.—Account of a newly produced Hybrid, 258.
Peaches, account of the numbers annually produced in the gardens at Wortley Hall, from the year 1808 to 1819, 80.—Notices of new varieties exhibited, 209,10.—On the advantages of a span-roofed glass-house for forcing them, 562.
Peach trees, advantages of their roots penetrating the border on the north side of the wall, 95, *et seqq.*—On an advantageous mode of training them, 140.
Pearmain, Baxter's, 67.—*Hubbard's*, 68.—*Fouldon*, 69.
Pears, notices of various kinds exhibited to the Society, 214,15, 518.
PENDERGAST, Capt. 341, 345, 6, 7.
PENN, JOHN, said to have first introduced the Ayrshire Rose into Scotland, 463, *note.*

Petit Jean Apple, 525.
Pepys, Mr. 158.
Phalæna brumata Linn. 135.
Phalangium esculentum, 445.
Phytolacca decandra, 444.
Pigeon's dung, advantages of using water, impregnated with it, as a manure, 412.
Pine, Queen, notice of one exhibited to the Society 52.
Pine, Apple, on the culture of, without bark, or other hot-bed, 72.—Notice of a specimen of the Welbeck Seedling, 213.—Description of a mode of culture of, in Mr. Jenkins's garden, 363.—Account of a mode of treating Pine plants, so as to make them produce fruit within the year, 392.—Observations on the production of seeds of, 533.—Account of a mode of treating Pine plants of extraordinary size, 555.
Pinks, on the cultivation of, 451.
Pippin, Colonel Harbord's, 65.—*London*, 67.—*White Stone*, 69. *Bayfordbury*, 528. *Fall*, 217.
Pinner Seedling Apple, 530
Plants, on the means of giving strength to the stems of those growing under glass, 1.—Enumeration of many which are erroneously considered as distinct, 19.
Plum tree, upon pruning and training the, 426.
Plums, notice of varieties exhibited, 207, 8.—Classification of, 323, 5.—On forcing them, 531.
Poire d'Ananas, 276.
Polo Family, probably introduced many arts from China into Europe, 224, 5.
Pomme Knight, 279.—De Wyneghem, *ib.*
Pomone Françoise, cited, 271.
Pope, Mrs. notice of a drawing by, 321.
Potatoes, Early, mode of raising, 447.
Poyntz, William Stephen, Esq. notice of a White Nectarine grown in his garden, 210.
Princesse d'Orange Pear, 277.
Psidium Cattleianum, account of, 315, 317.
Psoralia esculenta, 445.
Pterocarpus Marsupium, remarks on its propagation, 226.
Pyrus spectabilis, result of an experiment in ringing its bark, 129.

R.

Radishes, an account and description of the varieties of autumn and winter Radishes, 10.
Raffles, Sir Stamford, information from, respecting Crinum superbum, 425.
Ransleben, Mr. communication by, on the destruction of the Moths and Caterpillars of the *Phalæna brumata*, 135.
Ranunculus, on the cultivation of, 374.
Raphanus niger, 11.—*Orbiculatus*, *ib.*
Raspberry, Double-bearing Red, notice of, 55.—Early Red, 205.
Rawes, Capt. Richard, 340.
Redoute's *Roses*, cited, 171, 2.—*Liliacées*, 181, 289.
Rees's *Cyclopedia*, cited, 281.
Revelstone Pippin, 523.
Rhododendrons, Hybrid, remarks on, 24.
Rhubarb, method of forcing, applicable to its early production, 64.
Ricketts, Mr. 72.
Riddell, Ralph, Esq. his gardener's wash for destroying insects, 143.
Ringing the bark of trees and plants observations and experiments on, 121.—Physiological observations on its effects, 159.—Different effects of, 557, 8, 561, 564.
Rintoul, Mr. Samuel, notice of Spanish Onions grown by him, 139.
Robertson, Mr. John, on the advantages which Peach trees derive from their roots penetrating the border on the north side of the wall, 95, *et seqq.*—His classification of Plums, 323, 5.
Robson, Mr. Mark, his receipt for a wash for destroying insects on fruit trees, 143.
Rogers, Mr. Thomas, his account of the cultivation of Mushrooms, 472.
Ronalds, Mr. Hugh, notice of a Pear exhibited by, 214.—Of Apples, 216.
Rosa pimpinellifolia, 285.—*Arvensis*, 466.
Roses, mode of protecting their buds from insects suggested, 136.—Notice of nine kinds of Moss-Roses, exhibited, 137.—Account of the *Rosa Banksiæ*, 170, *et seqq.*—Description and account of the varieties of Double Scotch, 281.—List of, 302, 3.—On the Ayrshire Rose, 456, *et seqq.*
Rose dorée Pear, 277.

Roseberry Strawberry, notice of, 54, 5.
Rosier Pimprenelle Rouge, à fleurs doubles, note respecting it, 293.
Roth's Botanical Observations, cited, 491.
Roxburgh, Dr. his description of Crinum augustum, 424.
Royal Reinette, 529.

S.

Sabine, Joseph, Esq. observations on the glazing of hot-houses, 84.—Observations on and details of, some experiments in ringing the bark of fruit and other trees and plants, 121, *et seqq.*—Account of the *Rosa Banksiæ*, or Lady Banks's Rose, 170, *et seqq.*—Remarks on the Downton Strawberry, 199.—Note by, on the Pitmaston Orange Nectarine, 233.—Account of a newly produced Hybrid Passiflora, 258.—Description and account of the varieties of Double Scotch Roses, cultivated in the gardens of England, 281, *et seqq.*—On the *Psidium Cattleianum*, 316.—On a new Melon, 319.—Account and description of the varieties of Chinese Chrysanthemums, cultivated in England, 326, *et seqq.*—On the Ayrshire Rose, 457, *et seqq.*—Note on Cranberries raised in dry beds, 487.
Sabine d'Eté Pear, 275.
Sagittaria, 446.
St. John's Swan's Egg Pear, 214.
St. Simon's work on the culture of Hyacinths, cited, 163.
Saxe-Weimar, Grand Duke of, notice of a collection of wax models of German Fruits presented by him to the Society, 51.—Notice of a *Casuarina* grown at Belvedere, 58.
Schrank, Chev. Fr. de Paula, his account of a successful method of managing Aquatic and Bog plants at Munich, 395, *et seqq.*
Scilla esculenta, 445.
Scotch Roses. See *Roses.*
Scopoli *Deliciæ Floræ Insubricæ*, cited, 491.
Screveton Golden Pippin, 218.
Sea Kale, plan for forcing it without covering the plants with dung or litter, 63.
Seton, Alexander, Esq. his account of Walker's Hot-house flues, 237.
Seckle Pear, 520.
Seeds, notice of a plan, for bringing them from distant countries, 57.—Observations on the production of those of the Pine Apple, 533.
Seigneur d'Eté Pear, 276.
Shailer, Mr. Henry, notice of a singular flower from an Apple tree, exhibited by him, 136.—And of specimens of nine kinds of Moss Roses, 137.
Shepherd, Mr. John, his account of the *Amaryllis Johnsoni*, 501.
Silverlock, Mr. Henry, account and description of a hollow wall, 244.
Skreens for protecting wall trees, 93, 4.
Slade, Mr. John, specimens of an Apple sent by, 528, 9.
Smith, Samuel, Esq. on the management of his Vineries, 98.
Smith, Mr. James, notice of a new Seedling Plum raised by, 208.
Smith, Mr. James, notice of his communication to the Caledonian Horticultural Society, on the cultivation of Figs, 430.—Information from respecting the Ayrshire Rose, 463, *note.*
Species, its definition, 21.
Sompting, account of a Fig garden there, 504.
Spinach, New Zealand, account of, 488.
Steam, observations on its application in the house of Messrs. Loddiges, at Hackney, 56.—Account of a Steam Apparatus, 434.
Steam-Pits, description of those in the Taurida gardens at St. Petersburg, 468.
Stems of plants, on the means of giving strength to those growing under glass, 1.
Stewart, Mr. his substitute for putty in glazing hot-houses, 80.
Sweet's *Hortus Suburbanus*, cited, 336, *et seqq.*
Stocks, observations on the sorts of, 566.
Stoe, Harry, Esq. notice of an Apple, exhibited by, 217.
Stoffels, Mr. Louis, on an advantageous mode of training Peach trees, 140.—Description of varieties of Pears and Apples received from, 274, *et seqq.*
Strawberry, Roseberry, notice of some exhibited to the Society, 54, 5.—On its management, 234.—Downton, further particulars of, 197.—Hudson's Bay, 205.—Cockscomb Pine, *ib.*

Strawberries, remarks on the rapid formation of their blossoms and fruit, 479.
SUDLOW, JOHN, Esq. notice of a Seedling Apricot raised by, 207.—Of specimens of the Fall Pippin, 217.
SUFFIELD, Lord, 65, 6.
Sweeney Nonpareil, 526.
SWAYNE, Rev. GEORGE, notice of his cultivation of the *Vicia sylvatica*; and of a Seedling Apple raised by him, 141.—On the management of the Fig tree in the open air, 428.—Specimens of dried Figs, exhibited by, 564.

T.

Tarring, account of a Fig garden there, 506.
Taurida Gardens at St. Petersburg, description of the Steam Pits in them, 468.
TAYLOR, Mr. JOHN, observations on the method of glazing hot-houses recommended by him, 84, *et seqq.*
TAYLOR, Sir HERBERT, notice of his culture of the Zante Grape, 516.
Tetragonia, or New Zealand Spinach, 488.
Thomery, notice of the Grapes grown in that village, 271, *note.*
THOMPSON, Mr. JOHN, his method of preserving Grapes, 131.
THOROTON, Rev. Sir JOHN, notice of a seedling Golden Pippin raised in his garden, 218.
THORY, M., notice of a passage by him in REDOUTE'S *Roses*, 172, *note.*
THOYTS, Mrs. notice of a Peach raised by, 513.
THUNBERG'S *Flora Japonica*, cited, 329.
Tiles, notice of their application to protect young vegetables from excessive heat, 51.
Tillington Pear, 521.
TORBRON, Mr. THOMAS, instructions by, for forcing Cherries, 116, *et seqq.*
Transactions of the Linnean Society, cited, 259, 60, 281, 457, 491.—Of the *Royal Society of Gottingen*, 489.
Trapa natans, fruit of exhibited, 563.
Tritonia. See *Ixia.*
TURNER, Mr. JOHN, description by, of some varieties of Pears and Apples, received from Mechlin, 274, *et seqq.*
TWAMLEY, JOSIAH, Esq. results of his experiments in ringing the bark of fruit trees, 124.

V.

VACHELL, RICHARD, Esq. on a method of raising early Cucumbers, 455.
Variety, permanent or local, in plants, its definition, 21.—Accidental, 22.
Vegetables, Hybrid, on the production of, 15, *et seqq.*—Esculent, notice respecting several, 443, *et seqq.*
VERE, JAMES, Esq. mode of treating the *Azalea Indica* in his garden, 132. Chrysanthemum grown in it, 346.—On a method of propagating choice Dahlias in his garden, 476.
VERRELL, Mr. JAMES, notice relative to the management of the *Crinum Amabile*, 419.
Vicia sylvatica, notice of its culture, 141.
VILMORIN, M. description of Radishes raised from seed furnished by him, 12.—Notice of seeds of *Mais à poulet* sent by him to the Society, 53.—Particulars by, respecting the varieties of the Almond, 408, 9.—Observations by, on the varieties of Onion, 410.
Vines, an improved method of planting them for forcing, 4.—Account of a method of managing them in a common Grapery, 246, *et seqq.*—On grafting them, 495.—Notice of plants of, in pots, exhibited, 560.—Plan of exposing their branches, 567.
Violets, Neapolitan (*Viola odorata* LINN.) on their treatment, so as to make them produce a succession of flowers through the winter, 109, *et seqq.*
VIRGIL, cited, 453.

W.

WALKER, Mr. an account of his mode of constructing Hot-house Flues, 237.
Watsonia fulgens, 39.
Walls, Garden, notice of a plan of a hot wall, 139. Description of a hollow one, 244.—On the construction of their piers and copings, 269.
Wall trees, description of a skreen for their protection, 92, 3.—A new mode of fastening them, 569.
WALLICK, Dr. notice of seeds of a new Cu-

cumber, sent by him, with a description of the Cucumber, 136.
Walnut, the Highflyer, 517.
Waratah Camellia, result of an experiment on ringing its bark, 128.
Wasps, on the means of destroying them, 107.
Water Cress, account of the cultivation of the, 537.
WEDGWOOD, JOHN, Esq. his mode of growing *Buda Kale*, 570.
Weeping Apple, notice of a seedling so named, 141.
WELLS, Mr. JOSEPH, on the culture of Chinese Chrysanthemums, 571.
Wellington Apple, 529.
WELSTEAD, Capt. GEORGE, 338, 344.
WEST, Mr. JOHN, his mode of growing Onions of a large size, 138.—Description of an improved Forcing Pit, 220, *et seqq*.
White Stone Pippin, 69.
WHITSHED, Lady, a successful grower of the Dwarf Carnation, 556.
WHITLEY, BRAMES, and MILNE, Messrs. their culture of Double Scotch Roses, 286.
WICKHAM, Rt. Hon. WILLIAM, remark on his paper on the treatment of Fig trees, 431.
WILBRAHAM, ROGER, Esq. notice of a Peach raised by, 209.—Notice of a specimen of the Napoleon Pear, grown by, 215.—Specimens exhibited by, 519.—Specimens of the Scarlet Nonpareil, exhibited by, 561.
WILLDENOW, cited, 326, 7, 461.
WILLIAMS, Mr. RICHARD, notice of Flowers of the Waterloo Hyacinth raised by, 413.—Specimens of an Apple sent by, 529.
WILLIAMS, JOHN, Esq. his account of a new seedling variety of Grape, called the Alexandrian Ciotat, 8.—Notice of a Double-bearing Red Raspberry, raised by him, 55.—His substitute for the ringing of the bark of fruit trees, 123, *note*.—Notice of a Peach raised by, 210.—Of Pears raised by, 214.—Notice respecting the Pitmaston Orange Nectarine, 232.
WILLIAMSON, Rev. WILLIAM, on the cultivation of the Filbert, describing the method of pruning, as practised in the grounds near Maidstone, 145.—On the cultivation of the Ranunculus and Anemone, 374.—On a mode of preserving Geraniums during the winter, 414.
WILMOT, Mr. JOHN, communication by, on the advantages of fresh dung over decayed, 55.—Notice of the Early Red Raspberry, exhibited by him, 205.—Notice of a seedling Red Currant raised by him, 206.—Of his Early and Late Gooseberry, *ib.* 207.—Of specimens of Pines exhibited by, 213, 214.—Of the Gravenstein Apple, 216, 523.—Specimens of Pears exhibited by, 518.
WILSON, Capt. HENRY, 342.
Winds, effects of their action on the roots and branches of trees, 2.
Winter Majestin Apple, 68.—*Queening*, 70.
Wise's Apple, 217.
WOOD's *Synopsis of British Roses*, cited, 457.
Wood, reason why a mixture of dry and green affords greater light and heat, 158.
WOODFORD, Mr. EMPEROR, 260.
WORTLEY, JAMES STUART, Esq. account of the Peach trees in his garden, 79.
WYNN, Sir W. W. notice of the Banana tree in his garden, 137.

Y.

YATES and COX, Messrs. notice of nails for fruit walls, manufactured by, 418.
YATES, JAMES, Esq. his account of Orange and Lemon trees at Salcombe, 142.—Notice relative to the flowering of the *Agave Americana*, in his garden, 389.
Yew berries, instance of their not attracting wasps, 108.
Youlan of the Chinese, 59.

Z.

Zea Caragua, 54.

Printed by William Nicol, Successor to W. Bulmer and Co.
Cleveland-row, St. James's.